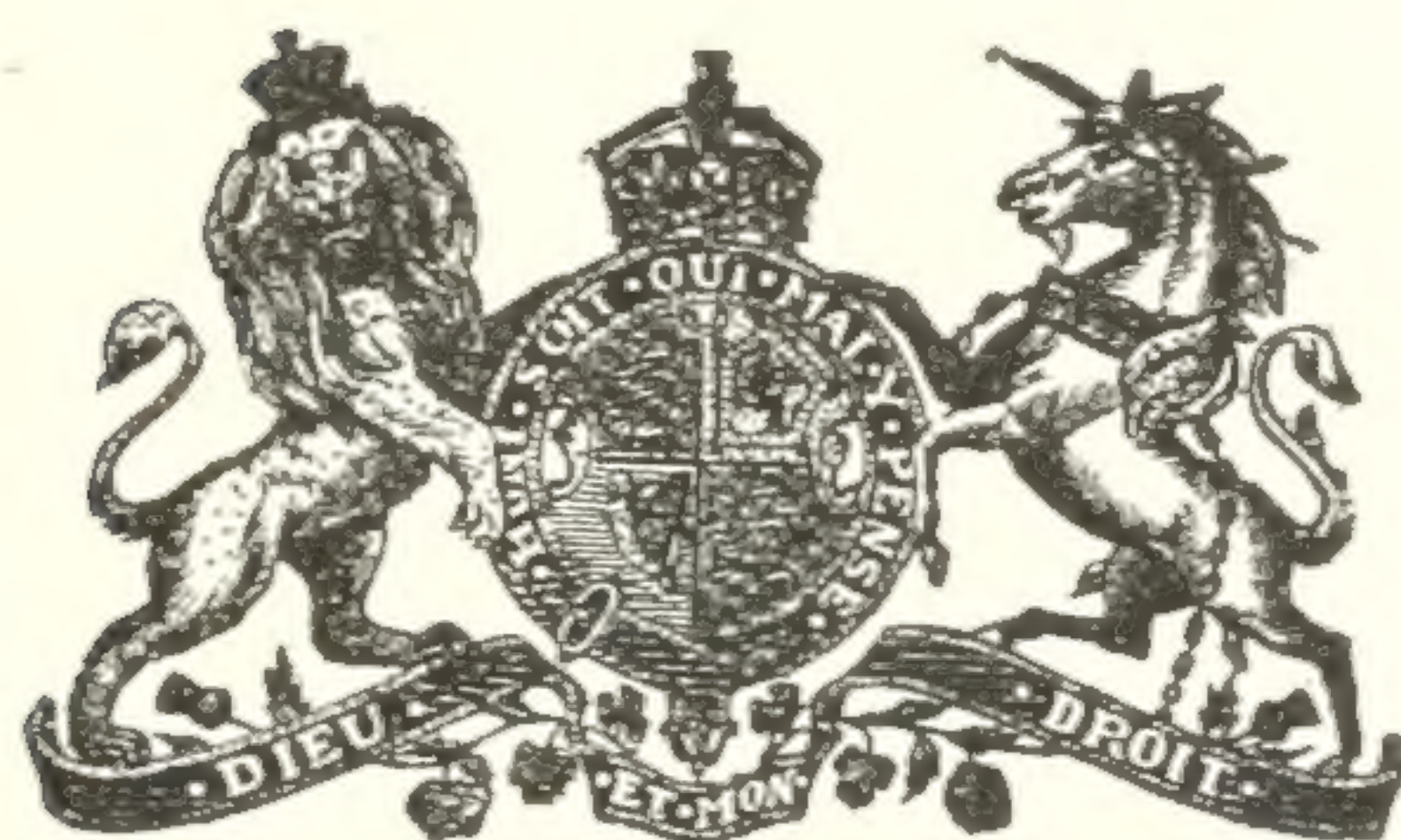


REPORT
OF THE
DEPARTMENT OF THE NAVAL SERVICE
FOR THE
FISCAL YEAR ENDING MARCH 31, 1911

PRINTED BY ORDER OF PARLIAMENT



OTTAWA
PRINTED BY C. H. PARMELEE, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY
1911

To His Excellency the Right Honourable Sir Albert Henry George, Earl Grey, Viscount Howick, Baron Grey of Howick, a Baronet, G.C.M.G., &c., &c., &c., &c., Governor General of Canada.

MAY IT PLEASE YOUR EXCELLENCY,

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the First Annual Report of the Department of the Naval Service, being for the year ended March 31, 1911.

I have the honour to be,

Your Excellency's most obedient servant,

LOUIS PHILIPPE BRODEUR,

Minister of the Naval Service.

DEPARTMENT OF THE NAVAL SERVICE,

OTTAWA, June, 1911.

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R E P O R T
OF THE
DEPARTMENT OF THE NAVAL SERVICE
FOR THE
FISCAL YEAR ENDED MARCH 31,
1911

OTTAWA, June 1, 1911.

SIR,—I have the honour to report on the Department of the Naval Service for the year ending March 31, 1911.

The Naval Service Act was passed on May 4, 1910, and steps were immediately taken to organize the Department of the Naval Service.

The Department is divided into the following branches:—

1. Naval.
2. Fishery Protection.
3. Tidal and Current Survey.
4. Hydrographic Survey.
5. Wireless Telegraph.

1. NAVAL BRANCH.

Rear Admiral C. E. Kingsmill was appointed Director of the Naval Service, and the services of four Naval Officers were obtained on loan from the Imperial Government to assist in the organization of the Department.

Orders in Council were passed appointing rates of pay and allowances for the Officers and men of the Naval Service, and regulations for the entry of Officers and men.

In October the department was transferred from the temporary offices on Slater street to offices which had been prepared in Sussex street.

Negotiations, which had been in progress to purchase cruisers from the Admiralty to serve as training ships, were completed after the passing of the Naval Service Act, and the first-class cruiser *Niobe* and second-class cruiser *Rainbow* were acquired, and, having undergone necessary alterations, the ships left England for their respective stations.

These ships were manned by a nucleus crew consisting of Active Service Ratings lent by the Imperial Government, and a proportion of Imperial Pensioners and Royal Fleet Reserve Men.

The *Niobe* sailed on October 10, and arrived at Halifax on October 21, where she remained during the winter in order to obtain recruits, and to assist in the organization of the dockyard.

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On arrival at Halifax, six midshipmen, who had been under training in C.G.S. *Canada*, together with their Naval Instructor, were transferred to *Niobe*.

The *Rainbow* sailed on August 18, and arrived at Esquimalt on November 7, after an uneventful but successful voyage, and had no defects to make good after her voyage of 15,000 miles. During the winter she cruised round Vancouver Island and along the coasts of British Columbia on Fishery Protection Service, and effected the capture of an American schooner for fishing inside territorial waters.

On the arrival of the ships at Halifax and Esquimalt, respectively, recruiting was started. By arrangement with the Post Office Department, postmasters were appointed Recruiting Officers in seventy-five (75) cities and towns in the Dominion; posters were exhibited throughout the Dominion and a recruiting pamphlet was widely distributed. As a result recruiting has been satisfactory, and the complement of the *Niobe* is practically complete whilst there are still a few vacancies in the *Rainbow*. As the advantages of the Service become more widely known, it is anticipated that there will be no difficulty in obtaining recruits.

In November, a competitive examination was held for the entry of Medical Officers to fill three vacancies; the results were quite satisfactory and the Officers were duly appointed.

In November a competitive examination was also held for the entry of Naval Cadets, at which twenty-one (21) qualified for entry; the hospital building in Halifax Dockyard having been altered and adapted for use as a College, the Royal Naval College was opened on January 19, 1911, when the first term cadets joined. Considerable progress has been made with their education, although naturally many difficulties had to be contended with at the start.

The Accountant and Stores Branches are being organized with the assistance of officers lent from the Imperial Service; contracts have been entered into for the supply of provisions and clothing in Canada.

The dockyards at Halifax and Esquimalt, having been transferred by Imperial Order in Council, were taken over by the Department in November, and are now administered by officials of the Department. It is not proposed to open up Esquimalt Dockyard at present since there is not sufficient work to employ a permanent staff; at Halifax, however, the work on the vessels connected with this Department and those under the control of the Department of Marine and Fisheries, will be sufficient to employ a permanent staff, and the dockyard staff has been organized accordingly.

The government programme for the construction of vessels comprises four (4) cruisers of the Improved *Bristol* Class and six (6) destroyers of an Improved River Class; tenders have been invited for the construction of these vessels, and are due on May 1, 1911.

The report of the Director of the Naval Service on the Naval Branch is appended at page 15.

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2. FISHERY PROTECTION.

The following ships were employed on Fishery Protection Service in the districts named during the year.

Canada.—East coast of Nova Scotia and Gulf of St. Lawrence.

Petrel, Constance.—East coast of Nova Scotia.

Curlew.—Bay of Fundy.

Vigilant.—Great Lakes.

Kestrel, Restless, Falcon.—Pacific coast.

These vessels were continually cruising during the fishing season watching the various fishing fleets.

On the east coast the Officers of the Fishery Protection Service report that the mackerel season was a bad one, whilst the lobster fisheries were good on the west coast of Nova Scotia, but only fair on the east coast.

On the Great Lakes comparatively little fishing took place.

On the Pacific coast considerable poaching has been reported, and in February, 1911, two whaling steamers, the *Grant* and *Sebastian*, were chartered and manned to assist in its suppression, on which duty they are still engaged.

The report of Rear Admiral C. E. Kingsmill on the Fishery Protection Service is appended at page 20.

3. TIDAL SURVEY.

The work of the Tidal and Current Survey was continued during the year.

An investigation of the tides was carried out for a length of 500 miles on the north shore of the Gulf of St. Lawrence. This work was hindered owing to the absence of wharfs on which to place the gauges; communication was also interrupted owing to an accident to the C.G.S. *Gulnare*, which ran ashore and had to be taken to Quebec for repairs. The results of the work were, however, satisfactory and will prove most valuable in determining more definitely the character of the tide throughout the gulf, as well as for the benefit of the local harbours along the coast.

The principal work in connection with the currents was done in connection with two of the important passes in British Columbia, Seymour Narrows and the Yuculta. Valuable data was obtained which will be of inestimable benefit to the large amount of traffic passing through these passes.

Valuable records of the set of the current were also obtained from the Light Ship off Heath Point, Anticosti Island.

The principal Tidal Stations on both coasts were continued in operation throughout the year, and the data obtained therefrom form the basis of the Tide Tables issued by the Department.

The report from Dr. Bell Dawson, Superintendent of the Tidal and Current Survey is appended at page 26.

4. HYDROGRAPHIC SURVEY.

The Hydrographic survey work is in charge of Mr. W. J. Stewart, Chief Hydrographer, and has made satisfactory progress during the year.

The survey work has been carried on under the following divisions:—

1. Great Lakes.
2. Atlantic Coast.
3. Pacific Coast.
4. Lake of Two Mountains.
5. Lake St. Francis.
6. Nelson River.
7. Fort Churchill.

The work in the Great Lakes was in charge of Captain Frederick Anderson, who conducted the survey from the steamer *Bayfield*. Much useful work was done including the location of dangerous shoals off Point Peter, Wicked Point and Scotch Bonnet Island and Presqu'ile, which have now been, for the first time, accurately charted.

The survey on the Atlantic coast is in charge of Commander I. B. Miles. The new steamer *Cartier* was commissioned for this service, this ship having arrived at Quebec on May 6, from Newcastle-on-Tyne, England, where she was constructed by Messrs. Swan, Hunter and Wigham Richardson at a cost of \$176,912. She is a twin screw steamer of 522 tons register, 163 feet long between perpendiculars, 29 feet beam and 15½ feet deep, and has a speed of about 12 knots; she is especially fitted for the surveying service and is an excellent sea boat. The season was spent in surveying in the vicinity of Rimouski, and as a result of this and previous years survey arrangements have been made for the issue during 1911 of a chart embracing the water from White Island to Bic Island.

On July 1, Mr. Venn took over the charge of the survey to enable Commander Miles to take charge of an expedition to Hudson bay.

The survey on the Pacific coast is in charge of Captain P. C. Musgrave, using the steamer *Lillooet* as a base. Surveying was carried out around Prince Rupert, the north side of Queen Charlotte islands, Masset Inlet and the eastern end of Dixon Entrance. There is still much work to be done in this direction, but it is expected that the survey will be completed before the traffic to Prince Rupert becomes extensive.

The survey of Lake of Two Mountains was completed and the surveying outfit was then transferred to Lake St. Francis for the purpose of completing the survey of the upper end of that lake. This work was well advanced before the season closed on November 24.

Owing to the proposal to build a railway from the Canadian Northwest to Hudson Bay, an expedition was fitted out to examine Ports Nelson and Churchill with a view to reporting on their suitability or otherwise as termini for railways, and as ports for ocean going vessels.

Two parties were organized for this service and the ice-breaking steamer *Minto* was loaned to the Department for the purpose of conveying these parties to Hudson Bay, being under the command of Commander Miles.

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Commander Miles furnishes an interesting and instructive report particularly with regard to the ice conditions.

A party under Mr. Bachand made a survey at Port Churchill which tends to show that it possesses advantages which render it suitable as a harbour for mercantile vessels, and capable of improvement at no great expense. The harbour is well sheltered, and there is good accommodation for the construction of wharfs sufficient to provide for large traffic.

Owing to the difficulties encountered it was not possible for the party at Port Nelson to do much surveying that can be put on paper, but much useful information was obtained which will be of great benefit in carrying out the future survey.

During the year the following new charts have been issued:—

Copper Island to Lamb Island.

Goderich Harbour.

Razado Island to White Island.

Approaches to Saguenay River.

Tree Bluff to Kinahan Island.

Quebec Harbour.

A second edition of the following charts was issued during the year:—

Montreal to Longue Point.

Three Rivers to Becancour.

Cape Levrard to St. Emelie.

St. Emelie to Deschambault

Head of Thunder Bay to Pigeon River.

Lamb Island to Thunder Cape.

Prince Rupert Harbour.

Lake St. Louis.

The report of the Chief Hydrographer, which includes Commander Miles' report on the Hudson Bay expedition, is appended at page 32.

5. WIRELESS TELEGRAPH.

The government owns and operates nine wireless stations on the Pacific Coast forming a complete chain from Victoria to Prince Rupert, the range of the stations varying from 150 to 350 miles.

Stations were completed at Triangle Island and Prince Rupert, and a complete new station was installed at Dead Tree Point at a cost of \$17,233.

Improvements were also made at the following stations, viz:—Victoria, Point Grey, Cape Lazo, Pachena, Estevan Point and Ikeda Head, at a total cost of \$29,461.

The power of the station at Victoria has been increased to enable communication to be established with Pachena.

The number of messages handled by the west coast stations was 48,074, containing 647,461 words, this showing a substantial increase over the previous year.

The total cost of maintenance of these nine (9) stations was \$30,864.53, and the revenue derived therefrom \$3,108.63.

On June 1, 1910, a commercial service was inaugurated in connection with the wireless stations on the west coast.

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On the east coast the government owns thirteen (13) stations which are operated by the Marconi Company under contract, the range of action varying from 150 to 400 miles.

These stations handled 49,339 messages during the year, containing 699,151 words. The cost of maintenance was \$44,524.21.

Stations at North Sydney and Pictou, range 100 miles, are owned and operated by the Marconi Company under contract with the government and handled 1,847 messages, containing 43,864 words. The cost of maintenance was \$3,499.98.

Land stations are owned by the government at Quebec and Grosse Isle, range 100 miles, and during the year a new station was installed on Magdalen Island, P.Q., range 150 miles, the Marconi Company constructing the same at a contract price of \$7,000. These stations are operated by the Marconi Company under contract and during the year handled 5,088 messages containing 108,623 words.

The Marconi Company own and operate land stations at Montreal, 200 miles; Three Rivers, 150 miles; Camperdown 250 miles; Sable Island, 300 miles; and handled at these stations 15,320 messages, containing 237,796 words.

During the year the wireless service has on several occasions proved of inestimable benefit to vessels in distress, communication by means of wireless having been instrumental in obtaining assistance.

The Government Steamers equipped with wireless are:—The *Quadra*, range 100 miles; *Minto*, 150 miles; *Stanley*, 150 miles; *Lady Laurier*, 150 miles; *Aberdeen*, 100 miles; *Druid*, 100 miles; *Earl Grey*, 200 miles; *Montcalm*, 150 miles; *Montmagny*, 200 miles; *Lady Grey*, 100 miles:

Licenses have been issued for the installation and operation of wireless stations in twenty-one steamers and three barges, and also for one experimental station at St. John, N.B.

No commercial licenses have been issued during the year.

A station has been erected by the Marconi Company at Port Arthur, Ontario, under an arrangement by which the government may take over the same should they wish to do so.

Arrangements are in progress for the establishment of a chain of wireless stations on the Great Lakes, from Port Arthur to Kingston, with a station at Kingston of sufficient range to communicate with Montreal. The scheme includes stations at, or in the neighbourhood of, the following points:—Kingston, Toronto, Port Colborne, Port Stanley, Sarnia, Tobermory, Midland, Sault Ste. Marie, Port Arthur.

The Trans-Atlantic station at Glace Bay, C.B., is owned and operated by the Marconi Company: this station is in communication with Clifden Station (Ireland). Messages are received for transmission to Great Britain at a cost of 10 cents per word for private messages and 5 cents per word for press messages. The business handled by the company averages 7,195 messages, containing 106,480 words monthly.

The report of the Superintendent of the Radio-telegraphic Service is appended at page 42.

I have the honour to be sir,

Your obedient servant ,

G. J. DESBARATS.

Deputy Minister.

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STATEMENT of Revenue of Department of the Naval Service for Fiscal Year ended
March 31, 1911.

Royal Naval College—

College fees for 21 cadets..	\$2,100 00	
Trust Funds..	4,200 00	
	<hr/>	\$6,300 00

Wireless Apparatus Licenses.. 2 00

Casual Revenue.. 739 40

Wireless Revenue—

Victoria Station..	988 16	
Point Grey Station..	498 76	
Cape Lazo Station..	29 67	
Pachena Station..	1,081 75	
Triangle Island Station..	2 25	
Ikeda Station..	164 97	
Prince Rupert..	329 88	
Dead Tree Point..	13 69	
	<hr/>	3,109 13

Total.. \$10,150 53

THE DEPARTMENT OF THE NAVAL SERVICE.

Financial Statement for the fiscal year 1910-11.

Naval Service—

Appropriation..	\$3,000,000 00
Expenditure..	1,790,017 16
	<hr/>
Expenditure less than appropriation.. . . .	\$1,209,982 84

Fisheries Protection Service—

Appropriation..	\$301,500 00
Expenditure, Naval Service.. . . .	\$166,743 10
do Marine and Fisheries.. . . .	105,477 52
	<hr/>
	272,220 62
	<hr/>
Expenditure less than appropriation.. . . .	29,279 38

Hydrographic Surveys—

Appropriation..	\$320,000 00
Expenditure..	163,118 21
	<hr/>
Expenditure less than appropriation.. . . .	\$156,881 79

Wireless Stations—

Appropriation..	\$150,000 00
Expenditure..	150,000 00
	<hr/>

Tidal Service—

Appropriation..	\$ 42,500 00
Expenditure..	32,538 64
<hr/>	
Expenditure less than appropriation.. . . .	\$ 9,961 36
<hr/>	

New steamer to replace ‘ La Canadienne ’—

Appropriation..	\$ 75,000 00
Expenditure..	31,353 14
<hr/>	
Expenditure less than appropriation.. . . .	\$ 43,646 86
<hr/>	

Civil Government—

Appropriation..	\$ 29,650 00
do from M & F.. . . .	30,916 56
<hr/>	
	\$ 60,566 56
Expenditure..	41,577 07
<hr/>	
Expenditure less than appropriation.. . . .	\$ 18,989 49
<hr/>	

Contingencies—

Appropriation..	\$ 20,000 00
Expenditure..	11,987 51
<hr/>	
Expenditure less than appropriation.. . . .	\$ 8,012 49
<hr/>	

SUMMARY.

Grand total appropriation..	\$3,969,566 56
Grand total expenditure..	2,492,812 35
<hr/>	
Grand total expenditure less than appropriation.. . . .	\$1,476,754 21
<hr/>	

SESSIONAL PAPER No. 38

REPORT OF THE MILITARY BRANCH.

OTTAWA, May 4, 1911.

The Deputy Minister,
Department of the Naval Service,
Ottawa.

SIR,—I have the honour to forward herewith the annual report of the Military Branch of the Department of the Naval Service for the year ending March 31, 1911.

The outcome of the Imperial Conference of 1909 was the determination of the Government to establish a Naval Service, and preliminary steps to this end were taken towards the latter part of 1909.

NAVAL SERVICE ACT.

On January 12, 1910, a Bill was introduced into the House of Commons intituled 'An Act Respecting the Naval Service of Canada.' After prolonged debate, it was finally passed and became law on May 4, 1910.

This Act provides for the establishment of a Department of the Naval Service and transfers from the Department of Marine and Fisheries, the Wireless Telegraph, Fisheries Protection, Hydrographic and Tidal Survey Branches.

The Act gives the Minister control of all naval affairs with a Deputy Minister Officer called the Director of the Naval Service.

It empowers the Governor in Council to appoint a Naval Board to advise the Minister and to organize and maintain Permanent, Reserve and Volunteer forces. The Governor in Council is also empowered to place at the disposal of His Majesty, for general service in the Royal Navy, ships or men of the Naval Service.

It also provides for the establishment of a Naval College; and the adoption of the Naval Discipline Act, and the King's Regulations and Admiralty Instructions in use in the Royal Navy.

ORGANIZATION.

Consequent upon the passing of the Naval Service Act, Mr. G. J. Desbarats was appointed Deputy Minister, and Rear Admiral C. E. Kingsmill, Director of the Naval Service. Four officers from the Royal Navy have been 'lent' by the Admiralty for duty at Headquarters, to assist in the organization and administration of the technical departments, whilst officers were appointed by the Civil Service Commission to organize the non-technical departments. A civil officer from both the Accountant and Stores Departments at the Admiralty has been 'lent' for a period of six months to advise on the organization of these branches.

The principal work effected in the new Department has been drawing up regulations for the government of the Naval Service, and for the entry of Officers and men and recruiting generally; the purchase and equipment of *Niobe* and *Rainbow* and the preparation of specifications for the ships of the government programme.

SHIPBUILDING PROGRAMME.

During the debate on the Naval Service Bill, Sir Wilfrid Laurier announced that it was the intention of the government to construct four cruisers of the improved *Bristol* class and six destroyers of the improved *River* class. These ships would all be constructed in Canada, if possible.

In July, 1910, advertisements appeared in the press announcing that the government intended to call for tenders for the construction of the ships. Consequently, firms desiring to tender were informed of the conditions of the contract and in February, 1911, those firms British and Canadian, who were willing to accept the terms of the contract, were invited to tender. These tenders have not yet been received as they are not due until May 1, 1911.

‘ NIOBE ’ AND ‘ RAINBOW. ’

Negotiations were opened with the Admiralty in the latter part of 1909, for the acquisition of two training ships. These were considered necessary in order to commence training the personnel for the ships of the government programme so as to have as many trained men as possible ready when the ships are completed.

The Admiralty had, at the Imperial Conference of 1909, recommended two ships of the *Rainbow* class for the purpose, and one was purchased for use on the Pacific coast, but it was felt that this would provide insufficient accommodation for recruits on the Atlantic coast; consequently after Parliament had approved of the proposal, *Niobe* was purchased.

These two ships are manned by nucleus crews, who are intended for the instruction of recruits, drawn from the Imperial Service, and lent by the Admiralty to the Canadian government, those on the active list for two years, reserve men and pensioners for three and five years, respectively.

In July, 1910, the Director of the Naval Service proceeded to England to attend the trials of these ships and take them over from the Imperial government. Certain alterations were found necessary in order to fit them as training ships; these being completed *Rainbow* commissioned on August 4, and sailed for Esquimalt on August 18, 1910, whilst *Niobe* commissioned on September 6, and sailed for Halifax on October 10, 1910.

Niobe was welcomed at Halifax on October 21, by the Minister of the Naval Service on behalf of the government, and *Rainbow*, at Esquimalt, by the Honourable Mr. Templeman on November 7.

The following are the principal details of the two ships:—

	“ Niobe. ”	“ Rainbow. ”
Length	435 feet.	300 feet.
Breadth	69 "	43½ "
Draught	26 "	17½ "
Displacement	11,000 tons.	3,600 tons.
Horsepower	16,500.	9,681.
Armament	16-6" Q.F. 12-12 pdr. Q.F. 3-3 pdr. Q.F. 2 - Maxims. 2-12 pdr. Field guns.	2-6" Q.F. 8-6 pdr. Q.F. 1-3 pdr. Q.F. 4 - Maxims. 1-12 pdr. Field gun.
Torpedo Tubes	2 submerged.	2 above water.
Coal Storage	1000 tons.	400 tons.
Speed	20·5 knots.	19·7 knots.
Complement	705.	273.

DOCKYARDS.

Halifax Dockyard was taken over from the Imperial Authorities on January 1, 1906, and utilized, to a certain extent, by the Marine and Fisheries Department. It has now been reorganized, Commander E. H. Martin, R.N., having been appointed in charge and other necessary officers appointed to deal with the increased work.

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February 25, 1910. Killed by rock falling on him on Walters & McGlades sub-contract.

Joseph Dufrank, Italian.

April 26, 1911. Accidentally shot by companion while out hunting, near Coo-coo-cache, on contract 11.

Evan Sloe, Bulgarian.

On M. P. & J. T. Davis' Contracts.

Contract 9.—September 12, 1910. Killed by ballast train while walking along track at mile 13, Quebec bridge west.

George Lamothe, French Canadian.

November 9, 1910. Struck by ballast train while driving across track at St. Augustin.

Auguste Brunet, French Canadian.

Ulderic Côté, French Canadian.

PROGRESS OF CONSTRUCTION WORK.

5. On contracts 7, 8, 9, 10 and 11 the grading is all completed, except in the case of several banks which have to be brought up to grade level. Steam shovel work is progressing satisfactorily. Grading operations on contract 12 are now well under way and will be completed over the whole contract by November next.

BRIDGES.

6. The concrete superstructure for all the bridges on contracts 7, 8, 9, 10 and 11 are completed. On contract 12, concrete operations were carried on at the 3rd St. Maurice river crossing, Manouan and Ribbon rivers. These crossings are finished. The Dominion Bridge Company erected during this year the 2nd and 3rd crossings of the St. Maurice river, the Flamand and Little Flamand rivers. They are now erecting the superstructure of the Manouan river.

TRACK-LAYING.

7. East of the Quebec bridge, 4 miles of track are laid in main line. West of the Quebec bridge, the main line track is laid on contracts 9, 10, 11 and part of 12, a distance of 241 miles.

BALLASTING.

8. East of the Quebec bridge, on contracts 7 and 8, about 40 miles of track have been ballasted. On contract 9, west of the Quebec bridge, a first lift of ballast has been given over the whole fifty miles. Sixty per cent of contract 10, and 75 per cent of contract 11 has been ballasted, and about six miles of contract 12.

FENCING.

9. The fencing of the line is progressing satisfactorily. It is impossible, however, to state exactly how much fencing is still required, as a considerable portion of the line which was unsettled at the time the grading was being done is now being opened up by settlers, rendered fencing absolutely necessary.

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TELEGRAPH LINE.

10. The telegraph line on contracts 7 and 8 is about in the same state as it was at the date of my report to March 31, 1910, i.e. none erected, but poles distributed on contract 8. On contract 9, 95 per cent of the telegraph line is completed; contract 10, 80 per cent; contract 11, 63 per cent; and it is being erected over contract 12.

BUILDINGS.

11. No stations, engine houses or section houses have been built as yet. The locations of these, as well as the plans, have now, however, been finally determined and active construction should begin during the season.

WATER SERVICE.

12. Since my last annual report, water tanks have been erected at miles 154, 175 and 194, on contract 11.

I have the honour to be, sir,

Your obedient servant,

(Sgd.) A. E. DOUCET,
District Engineer.

NORTH BAY, Ont., May 5th, 1911.

GORDON GRANT, ESQ.,
Chief Engineer,
Ottawa, Ont.

DEAR SIR,—As instructed by you, I beg to submit the following report of work done on this district during the fiscal year ended March 31, 1911:—

DISTRICT BOUNDARIES AND STAFF.

On November 1, 1910, Districts 'C' and 'D' were combined under myself as District Engineer, Mr. G. L. Mattice formerly district engineer 'D' remaining in North Bay as my assistant. On same date sixty miles of district 'E' were added to west end of District 'D' placing all contract 16 on that district and 71:40 miles of east end of District 'C' (being eastern portion of contract 13) were added to District 'E.' Mr. A. Sunstrum, Division Engineer No. VI. resigned December 1, 1910, his work being taken over by Mr. Holland in addition to the latter's other work.

Mr. A. McLellan, Division Engineer on District 'E' was taken over by District 'D' to be in charge of opening up above mentioned 60 miles added to 'D' from 'E.'

On account of steel being laid during the year for a considerable distance east and west of Cochrane (which is located about the centre of the new combined districts), we have been enabled to close down a good many residencies adjoining the track, one assistant engineer being able to look after two and sometimes three residencies. On the other hand six new residences have been opened at west end of district.

CONSTRUCTION.

Contract No. 13.—Macdonell & O'Brien, General Contractors. A party of engineers is now revising parts of our final location on this contract, with a view of reducing, if possible, the cost of construction and better the alignment and grades.

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Contract No. 14.—G. T. P. Ry., General Contractors. Messrs. Foley, Welch & Stewart, agents for the General Contractors, have during the year under review nearly finished the grading throughout this 150 mile contract, and have also filled in a number of temporary trestles and other gaps with material brought from borrow pits by train. Track is laid east from Cochrane for a distance of 95 miles, and ballasting has been kept up as closely as possible with the track laying, several good pits having been found within easy distance. Owing to the deep snow and general severity of the past winter, it was, however, found necessary to close down track laying and ballasting about last January, hence less progress was made with this particular work than we hoped to make at commencement of winter.

Nearly all the concrete work in the Ontario portion of this contract is now finished, and two large steel bridges across the Abitibi and Nistongo rivers have been erected. Steel for other bridges has been delivered to sites of same.

Telegraph line is erected for 53 miles east of Cochrane. Two permanent water tanks have been erected.

Contract No. 15.—E. F. & G. E. Fauquier, General Contractors. Grading and track laying have been completed on this contract which extends 100 miles west of Cochrane, during the past 12 months. Ballasting and train filling up to the Ground Hog river (80 miles west of Cochrane) is practically finished; beyond that point, on account of the scarcity of gravel, very little ballasting has been done, but a large amount of train fill material has been deposited in place. Concrete work has proceeded most satisfactorily, only one large bridge substructure being unfinished at March 31, 1911. During the past year steel bridges have been erected over the Frederick House, Buskegow, Driftwood, Poplar Rapids and Wellington Creek river, and erection of steel bridges over the Mattagami and Ground Hog rivers was in progress at March 31, 1911.

Telegraph line is erected for 77 miles west of Cochrane.

Three permanent water tanks have been erected.

The only work still to be done on this contract consists of concrete, train filling and ballasting, all of which should be completed during the coming summer.

Contract No. 16.—M. P. & J. T. Davis, General Contractors, transferred to O'Brien, McDougal & O'Gorman. Length 100 miles. The grading on the first 40 miles of this contract (which were included in old District 'D') has been practically completed during the year under review. The remaining 60 miles, transferred from 'E' was opened up during last winter, the contractor cutting roads, building camps, putting in supplies and getting a start made with construction work over nearly the whole length. Track has been laid on 20 miles of this contract at 31st March, a large trestle built across the Missinabie river and another in progress across the Mattawishquia river. A commencement had also been made with the concrete work of the contract at the abutments and piers of the Missinabie river bridge.

This contract is now in good shape for great progress to be made on it during the coming summer and fall in all branches of construction.

TRANSPORT.

Supplies to residencies situated on or near the track have been delivered in small quantities as required. During last summer we put in about 30 tons of provisions to the residencies, then west of end of steel, by means of canoe service on the Missinabie river.

This latter work was necessitated by the break up of the 1909-10 winter roads, which occurred a month earlier than usual. During the winter just closed, we have delivered all necessary supplies to our residencies along western half of Contract 16.

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FIRES, DAMAGES TO PROPERTY, ETC.

Several small bush fires occurred along the line during last summer, but only one caused any serious damage. This fire burnt a sub-contractor's camps at Mile 244, with all his supplies and outfit, and as it was impossible to put in more supplies during the summer, this five miles of work was closed down, but was reopened last winter.

ACCIDENTS AND SICKNESS.

This portion of the work has been surprisingly immune from sickness or accidents during the past year. On December 1st last, L. Ranger, mail carrier for the commission, was accidentally shot at Residency 17-C, dying a few days later at New Liskeard Hospital. One of Foley, Welch & Stewart's conductors was killed while coupling cars in ballast pit, and two men were drowned in the Kapuskasing river. These have been the only fatalities on the district.

Yours truly,

A. N. MOLESWORTH,
District Engineer 'D.'

NIPIGON, ONT., May 10, 1911.

GORDON GRANT, Esq.,
Chief Engineer, T.C.R., Ottawa, Ont.

DEAR SIR,—In accordance with your instruction, I beg to submit the following report for the fiscal year, 1910-1911, ending March 31, 1911.

Owing to the West 60 miles of contract No. 16 being added to District 'D', the length of District 'E' is now 195.19 miles, from District Mileage 60 to 255.19, which equals through mileage 1428.04.

PROGRESS OF CONSTRUCTION WORK.

On contract No. 17, covering 100 miles, from District Mileage 60 to 160 (through mileage 1232.85 to 1332.85), O'Brien, McDougall & O'Gorman Agents.

A year's supply of provisions and material for this contract were distributed during the winter, and the main camps and warehouses built. Sub-contracts were let covering the whole work, with the exception of the grading between Miles 110 and 140, which was short of cars and rails which were needed at Miles 121-124 and Miles 128-132. At these two points the heaviest work on the whole contract is to be done. Mr. O'Brien says this work will be opened up the coming winter, and if necessary he will lay temporary track around this work, and do it by steam shovel. The cuts in question are supposed to be sand and gravel.

In the month of March 90 acres of clearing was done. Labour seems to be plentiful and contractors should make a good showing this summer.

Timber for temporary trestles is available on the various streams where structures are to be erected, and gravel for ballast is being looked up along the line.

Contract No. 18.—E. F. & G. E. Fauquier, Contractors, Nepigon Construction Co., Agents, covering 75 miles, from District Mileage 160 to 235 (through mileage 1332.85 to 1407.85). Grading is now about 82 per cent completed; Concrete and bridge sub-structures 53 per cent completed and work of all classes 65 per cent completed. A number of sub-contractors have finished up and left. No track has yet been laid, as tracklaying will come from east and west, the junction being made somewhere near the east end of this contract. Temporary structures for bridges are now being erected.

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Contract No. 19.—O'Brien, Fowler & McDougall Bros., Contractors, covering 20.19 miles, from District Mileage 235-255.19, west end of district (through mileage 1407.85 to 1428.04).

Work on part of this contract stopped on account of loss of supplies and camps by fire, about July 1. These were replaced in January, when sleighing started, and work is now being pushed, several night shifts being employed. Total completed, 42 per cent.

Tracklaying is expected to reach the west end of the district about October or November, and by that time there will be from 95 to 115 miles of continuous grading ready for track, westward from this point.

ACCIDENTS AND SICKNESS.

No accidents have occurred among our engineering staff but there were two cases of sickness.

Fatal accidents among the contractors' employees on this district, from March 31, 1910, to March 31, 1911, were as follows:—

July 2.—Harry Olsen, Swede, Dynamite Explosion.

July 2.—Louis Carlson, Swede, dynamite explosion.

Morris, Mackie & Co.—Sub-contractors.

November 15.—John Stevenson, Galician, dynamite explosion.

Bonfield & Harvey—Sub-contractors.

BUSH FIRES.

Bush fires were very destructive about the end of June and destroyed a number of camps and a great amount of supplies, which were badly needed by contractors, as they could not be replaced till sleighing started last winter. Two engineering residencies were also burnt with contents, also storehouses, but all books and notes relating to the work were saved.

On contract 18 the loss was about.. . . .	\$33,250.00
On contract 19 the loss was about.. . . .	53,297.18
Engineering camps and supplies.. . . .	3,200.00

Total.. . . .	\$89,747.18
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The work generally was not delayed except on contract 19, Mile 252-255.19. Here sub-contractors lost their camps, and supplies for one year. A full report on fires was made to you on August 12, 1910.

TRANSPORT.

Supplies for one year were distributed from Nepigon and Cochrane, to 16 residencies, covering the whole District and 8 warehouses were built on contract 17 during the Winter. This work was all done by contract, but the proper distribution, erection of buildings and the removal of supplies from our old caches, was thoroughly looked after by our Transport Officer, Mr. A. E. Fraser.

MAIL SERVICE.

A weekly mail service was carried on throughout the summer and gave every satisfaction, but was rather irregular during the winter, owing to the conditions of the ice on Lake Nepigon. Arrangements are being made for the coming summer.

POLICE PROTECTION.

The service rendered by Mr. Quibell, Police Commissioner, was very satisfactory, and intoxicating liquors have been practically unknown on the work in this district.

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MEDICAL SERVICE.

On contract 17, hospitals are being built and doctors sent in.

On contract 18, one hospital is kept open, on east end of work, balance being completed.

On contract 19, there is one hospital and doctor.

No complaints have been received so I think service is satisfactory.

Inspection trips were made in June and October, 1910, and March, 1911, and everything was found in order.

Yours truly,
(Sgd.) T. S. ARMSTRONG,
District Engineer.

OFFICE OF THE DISTRICT ENGINEER,
ST. BONIFACE, MAN., May 12th, 1911.

Mr. GORDON GRANT,
Chief Engineer,
Ottawa, Ont.

DEAR SIR,—I have the honour to submit the following report of work done in District 'F' for the fiscal year ending March 31, 1911.

All location on district completed at date of last report, excepting that portion between Springfield Terminal shops and Red River bridge, known as "Winnipeg Entrance," the final route of which was approved by Order of Privy Council on March 15, 1910. Final location completed April 21st, 1910, and right-of-way plans filed on July 16, 1910.

The whole district is still under construction (including part of Contract No. 21, from Winnipeg to Pelican Falls, 246·67 miles, and Contract 20a, from the latter point to Superior Junction, 12·5 miles, or 259·2 miles, which are now being operated by the Grand Trunk Pacific Railway.)

I shall, therefore, take up each contract from the east end of the district, as they run consecutively from east to west. The contracts are as follows:—

Contract.	District Mileage.	Mileage from Moncton.	Contractors.
19.....	0 to 105·3.....	1428 to 1534·02.....	O'Brien, Fowler & McDougall Bros.
20.....	105·3 to 117·98...	1534·02 to 1546·69.....	" "
20-A.....	117·98 to 129·47....	1546·69 to 1558·18.....	" "
21.....	129·47 to 376·59...	1558·18 to 1805·30.....	J. D. McArthur.

Contract No. 19.—On this contract are:—

Division No. 2, Mile 0 to 40. Residences Nos. 6,7, 8 and 9.

Division No. 3, Mile 40 to 78. Residences 10, 11, 12 and 13.

Division No. 4, Mile 78 to 105. Residences 14, 15 and 16.

Division No. 2, Mile 0 to 40. W. W. Bell, Division Engineer.

Work on this division has been carried on continuously during the past twelve months. The percentage of grading done has increased from 15 to 80 per cent during that period; the total varieties of work now done is 55 per cent of approximate cost.

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This division lies farthest away from source of supplies; the nearest points being Nipigon on the Canadian Pacific line, and Wako on Grand Trunk Pacific branch from Fort William.

There are no heavy structures on this division.

Division No. 3, Mile 40 to 78. H. L. Bucke, Division Engineer.

The grading on this division has been carried on without intermission; all the cuts have been completed as far east as Mile 53. The finishing of a few cuts and some light grading remain in the eastern 15 miles of this division, which can, however, be completed by the time the track reaches that point. Over 75 per cent of the grading has been completed; the balance consisting of remaining rock cuts and some rock-borrow. Over 60 per cent of work of all varieties has been completed.

Track laying is at present at Mile 79. There is considerable amount of train work on this division which will be started early in April.

Division No. 4, Mile 78 to 105.3. H. J. McKenzie, Division Engineer.

Grading on this division has practically been completed, and track laid over the whole distance. Ballasting and train filling was carried on all last summer and fall. All train-filling completed as far east as Mile 95.

All permanent structures on this contract have been completed as far as Mile 40, including the superstructure at Sturgeon River Crossing, Mile 93.2 which is one 220 foot through span.

The remaining structures to be erected on this Contract (No. 19) are as follows:—

District Mileage.	No.	Size.	Description.	Remarks.
17.6.....	1.....	20' x 15'	Arch culvert.....	
19.7.....	1.....	90'	Deck girder	Lookout River.
25.2	1.....	25'	Arch culvert.....	Re-inforced.
29.6.....	1.....	80'	Deck girder.....	Redhead River.
32.....	1.....	20'	"	Rocky River.
39.4.....	1.....	150'	Through span	Allan Water.

Contract No. 20, Mile 105.3 to 117.98.

This forms part of Division No. 4, Res. No. 17 and is the 12.67 miles lying immediately east of Superior Junction. Practically the whole of this contract has been graded, track laid and ballasted, and all temporary trestles filled in.

Contract No. 20a, Mile 117.98 to 129.47.

This 11.49 miles is being completed by Messrs. O'Brien, Fowler & McDougall Bros., the main line, which has been operated by the contractors for constructing purposes during the period this report covers, was handed over to the Grand Trunk Pacific Railway on October 15, 1910, to temporarily operate, and is still being operated by the railway company.

The contractors have since March 31, last, been working on the erection of the substructure of the Sioux Lookout bridge, which was completed early in November, 1910, also on the Sturgeon river bridge substructure, the two abutments of which were completed in August, 1910, and the two centre piers are now being completed. Temporary trestles are still being used to operate the trains. Everything is completed for

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the erection of the Sioux Lookout Bridge, superstructure work on which has now begun. The contractors, the Canadian Bridge Co., expect to have same completed early in May.

Work at the divisional yard at Graham has been carried on incessantly, and though not altogether finished, still sufficiently advanced to permit operation of freight service between Winnipeg and Fort William. The round house and repair shop is almost completed. Coming under separate contracts the special station and ice house have been completed, and work is proceeding on the freight shed and store house. Tenders are now being considered on coal chutes and cinder hoists. The water service is also being completed.

Contract No. 21, Mileage 129.477 to 176.59.

The work on this contract is practically completed, that is, from Pelican Falls to the Springfield yard.

The Grand Trunk Pacific have been operating freight trains on the said portion since the 7th October, 1910, the agreement between the contractor, the railway company and the Commissioners having been extended.

There is still a certain amount of filling to be done at the Redditt Yard, and a few places to be trimmed up, especially at the different places where sink-holes had developed, and on very high embankments. These may require considerable train-fill during the summer of 1911, and some more ballast here and there for final touches, such as are always required on a new roadbed, but it will be done without interfering with the circulation of trains.

Work on the entrance into Winnipeg from the Springfield Yard is now being proceeded with, and will be completed this coming summer of 1911.

The station buildings, section houses, tool houses, &c., Contract No. 24, have all been erected along the line covered by Contract No. 21. The roundhouses and ice-houses at Redditt and Springfield have been completed, and the freight sheds and storehouses, at Springfield, Redditt and Graham are now under construction. Tenders for coal chutes and cinder hoists are now being considered. Water service at Springfield and at Redditt, is being completed this summer.

Contract No. 22. Red River Bridge and Approaches to Union Terminal Station.

This contract has now been completed by Messrs. Haney, Quinlan & Robertson, and the Bridge Company have about completed the steel superstructure over the Red river, and will proceed with the erection of spans over the streets in Winnipeg, between the Red river and Water street, immediately.

Contract No. 23 Terminal Shops and Other Contracts.

The following is a copy of report from F. W. Walker, Superintendent Terminal Shops and different other contracts, and extra work in connection therewith:—

Springfield Shops, Contract No. 23. Haney, Quinlan & Robertson, Contractors. Work done during 12 months ending March 31, 1911, has consisted of general construction work in connection with the Locomotive Shop buildings, steel work erection, concrete, brickwork, roofing, skylights, etc. The storehouse, oil house, stores platform, carpenter shop, frog and track shop and crude oil storage were practically completed by that date, and the remaining buildings completed with the exception of their floors which will be put in as soon as the machine tool foundations are completed. The plant was heated by temporary arrangement during the winter and the various branches of the work carried on throughout the plant. This contract is about 95 per cent completed.

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2,000,000 gal. reservoir. Contract 23a.—Work was started on this contract in May, 1910, and 20,000 cu. yds. of excavation taken out and approximately 6,800 cu. yds. concrete poured to form the two basins. The reservoir has been roofed and the wiring and heating pipes put in place. This contract is completed with the exception of a little painting and back filling.

Piping for Shops. Contract 23c.—Wiring ducts, etc., etc. Work has not yet been commenced on either of those contracts.

Red River Pump House. Contract 27.—J. McDiarmid Co., Ltd. The Pump House building is complete in every respect, and the equipment installed, the only portion of the work remaining being a small amount of back filling in the suction pipe trench.

Yard Water System, Springfield Shops. Contract No. 28.—Cotter Bros. Work was started on this contract last week in March, and is progressing rapidly. All the pipe was delivered on the ground by the end of the month.

Red River Pump House Equipment. Contract No. 29.—This equipment consisting of piping, engines, producers, pumps, etc., was delivered and erected at the Pump House and was in operating condition at the end of March, the only remaining work being the installing of the brass handrailings, etc.

Wiring for light and power, Springfield Shops. Contract No. 30.—A carload of material was delivered for this contract but work was not started by the 31st March.

Locomotive Shop Equipment and Power House Equipment.—Large quantities of machinery have been delivered and unloaded at the shops and a number of machines placed on their foundations. Eleven of the electrical travelling cranes have been installed complete and work has been under way steadily on foundations for the various machine tools in the different buildings and is making good progress. Work was started during March on the installation of the boilers and engines in the power house and is progressing well.

Force Account Work. Temporary Heating. E.W.O. No. 784 & 799.—The shops were heated during the winter under the above extra work orders and work was carried on steadily and good progress made on the various classes of work.

Shop Sewer System. E.W.O. No. 787.—Work has been carried on under this extra work order and up to the end of March all the sewers around the shops had been laid and manholes practically completed. Forms were also built ready for the pouring of the walls of the sewer pump house as soon as the weather permitted. Under other extra work orders work was carried out on installing of crane runway rails, placing of machinery on foundations, etc.

Union Depot.—Work on this contract during the twelve months ending March 31, 1911, has consisted of plastering, painting, plumbing and wiring and general finishing work. The south half of the building and the rotunda were completed early in March and the Grand Trunk Pacific moved into the new offices. The north half of the building was practically completed by the end of March and was making good progress. Work was started on the passenger train shed in March and erection was proceeded with rapidly.

Contracts No. 25 & 26. Supply of Water from Red River to Transcona.

This contract has been completed. The Western Contracting Co., Contract No. 25, having dug the trench, and the Canadian Pipe Co., Contract No. 26, having laid the pipe. The line is now being used for the supply of water for shops and yards.

Contract No. 26a.—Sewer pipe from Pump House in Terminal Yards Transcona to Seine River. This work was commenced in November, 1910, and on March 30, 1911, there was 70 per cent of the work done, and it is expected to be completed by the 1st July, 1911.

POLICE.

The following is copy of report from our Commissioner of Police, Mr. Quibell:—

The undersigned respectfully begs to submit his report as Commissioner of Police for the fiscal year ending March 31, 1911. During the past year a number of convictions have been made, and fines imposed amounting to \$1,680. A considerable number of guns, revolvers and other dangerous weapons were seized and all but the guns confiscated. 753 packages of liquors were seized and destroyed, and three persons committed to various terms of imprisonment in lieu of payment of their fines. Eight constables are employed in the district, and these practically patrol every mile of road upon which men are working. At the present time a determined effort is being made to drive every vagrant from off the line. It is a matter for congratulation that no houses of prostitution or of a disreputable character exist along the line of railway in this district.

ACCIDENTS.

I regret to have to record the death of eleven men and eighteen injured from April 1, 1910, to March, 1911, as per the following list:—

Date of Accident.	Division.	Name.	Killed.	Injured.	Cause of Accident.
1910.					
April 8th.....	Terminal shops.....	Fred. Fontaine		1	(Right foot). Not known.
May 17th.....	"	J. Cairns.....		1	Breaking of 2"x6' timber used as scaffold,
" 18th.....	"	C. Cowan.....		1	Falling off scaffold.
" 19th.....	7	Peter Orchinen.....	1		Engine mounting rail and turning over.
"		Davis Ingersoll	1		
June 8th.....	Terminal shops.....	J. Conlin.....		1	Concrete loader falling on his back.
" 11th.....	"	Neil Curry.....		1	Falling off scaffold.
" 22nd	3	Ed. Mackie.....	1		Struck by ring of derrick cable and died as result in hospital on 27th June, 1910.
July 14th.	3	Frank Gazzarano.....		1	Premature explosion.
" 27th.....	7	Toni Critelli.....	1		Gin pole falling back.
"		(Unknown carpenter).....		1	
" 13th....	Terminal shops...	J. McLeod.....		1	} Ran over by ballast train.
"		Mike Forncisk.....		1	
"		Lesecutine Strougal.		1	Premature explosion.
"		Louis Sagovitch.....	1		" "
"		John Shultz.....	1		" "
"	2	K. Sunderland.....		1	" "
Nov. 2nd.....		N. Hlowkyn.....		1	" "
"		J. Miller.....		1	" "
1910.					
Jan. 20th.....	2	E Barkland	1		Premature explosion.
"		Iver Jonson	1		Prem. explosion in powder h'se.
"		C. Jonson.....	1		" "
"		B. Olson.....	1		" "
Feb. 8th.....	2	Gust. Lidfos.....		1	" "
"		O. Morral.....		1	" "
"		H. Larsen.....		1	" "
"		O. Linde.....		1	" "
"		R. Angus.....		1	" "
March 28th...	Terminal shops.....	Louis Leviskey.....	1		Loading gravel. Dug under same and caved in.
		Totals.....	11	18	

Yours truly,
(Sgd.) S. R. POULIN,
District Engineer.

STATEMENT showing Approximate Cost of Steel Bridges and Amounts Paid on Contracts to March 31, 1911.

DISTRICT 'A'.

Name.	Through Mileage.	Description.	Contractor.	Estimated Weight of Steel in Pounds.	Rate per Pound.	Timber.	Rate per M. ft. B.M.	Total Esti- mated Cost of Super- structure.	Paid to March 31, 1911.
							\$	%	\$
Over Xing Highway.....	8.50	1 18' dk. pl. gr. span.....	Dominion Bridge Co.	12,000	4.375	5,500	47 00	783.50	834 19
Canaan River Viaduct.....	21.70	5 30', 5 60' and 1-80' dk. pl. gr. spans, 5 towers 30' span.	Canada Foundry Co.	840,000	4.5	73,400	47 00	41,249.80	41,608.73
Over Xing Red Bank Road.....	54.60	1-66' thro. pl. gr. span.....	Dominion Bridge Co.	110,097	4.375	10,935	47 00	5,330.68	5,330.68
Salmon River (Chipman).....	57.00	4 40', 4 60', 2 80 dk. pl. gr. spans, 4 towers 40' span and 4 150' dk. truss spans.	Canada Foundry Co.	2,200,000	4.65	160,000	47 00	109,820.00	108,537.47
Over Xing Salmon River Road. Newcastle Stream.....	57.50 67.00	1 24' 4" dk. pl. gr. span..... 4 40', 6 60' dk. pl. gr. spans, 4 tow- ers 40' span and 1 rocker bent.	W. P. McNeil & Co. Structural Steel Co..	23,000 1,000,000	4.34 3.95	5,600 72,000	51.50 37 00	1,286.60 41,164.00	1,280.20 42,164.50
Cains River.....	82.00	1 80' dk. pl. gr. span.....	W. P. McNeil & Co.	92,400	3.96	12,800	45 00	4,235.04	3,857.99
S.W. Miramichi River.....	124.50	1 175' thro. truss span.....	Dominion Bridge Co.	448,000	4.17	24,800	47 00	19,847.20	12,993.40
N.B. of S.W. Miramichi River.	133.00	1 125' thro. truss span.....	"	260,000	4.17	18,600	47 00	11,716.20	7,709.28
Juniper Brook.....	124.67	1 44' thro. pl. gr. span.....	W. P. McNeil & Co.	51,000	4.00	8,300	45 00	2,413.50	1,748.60
Odell Brook.....	150.00	1 44' thro. pl. gr. span.....	"	51,000	4.00	8,500	45 00	2,422.50	1,782.48
Tobique River.....	165.20	3 140' dk. truss, 2 100' and 1-80' dk. pl. gr. spans.	Canada Foundry Co.	1,335,400	4.38	92,000	46 00	62,722.52	68,676.91
Over Xing Highway.....	165.70	1 22' 7" dk. pl. gr. span.....	Dominion Bridge Co.	15,000	4.94	5,700	52 00	1,037.40	1,097.97
Graham Brook.....	180.70	3 60', 3-50' and 5 40' dk. pl. gr. spans and 5 towers 40' span.	"	910,000	4.34	73,800	52 00	43,279.60	22,465.19
Caton Brook.....	181.80	11 60' and 10 40' dk. pl. gr. spans, and 10 towers 40' span.	"	2,335,000	4.34	142,800	52 00	108,764.60	45,150.80
Under Xing Foley Brook Road. Little Salmon River.....	182.90 184.70	3 22' 1 beam spans..... 25 100' 3", 24-58' 9" thro. pl. gr. spans, 24 towers 58' 9" span.	" " Structural Steel Co..	31,000 2,480,000	4.89 4.68	6,800 518,000	52 00 46 00	1,869.50 679,028.00	778.95 580,401.25
Under Xing Falls Brook Road Little River ..	190.00 192.00	1 99' pony truss span..... 11-40', 9 60', 2 80', 1 100' dk. pl. gr. spans, 11 towers 40' span.	"	57,000 2,480,000	4.94 3.95	9,000 169,000	52 00 37 00	3,283.80 104,213.00	1,850.85 100,250.65
Four-Mile Brook.....	197.60	6 30', 1 59'-7", 5 60', 1 75' dk. pl. gr. spans, 6 towers 30' span.	W. P. McNeil & Co.	985,000	4.34	83,000	40 00	46,069.00	36,510.69
Grand River.....	207.80	2 88' thro. pl. gr. spans.....	"	307,000	3.94	27,000	42 00	13,229.80	11,409.24
Sigas River.....	209.80	1 80' dk. pl. gr. span.....	"	93,000	3.89	13,000	42 00	4,163.70	3,775.00
Quisibis River.....	213.80	1-99' thro. pl. gr. span.....	Dominion Bridge Co.	184,000	4.39	16,000	47 00	8,829.60	7,614.47

STATEMENT showing Approximate Cost of Steel Bridges and Amounts Paid on Contracts to March 31, 1911.

DISTRICT 'A'--Continued.

Name.	Through Mileage.	Description.	Contractor.	Estimated Weight of Steel in Pounds.	Rate per Pound.	Timber.	Rate per M. ft. B.M.	Total Esti- mated Cost of Super- structure.	Paid to March 31, 1911.
							\$	\$	\$
Green River.....	220.90	2 77' thro. pl. gr. span.....	W. P. McNeil & Co.	240,000	1.04	23,500	42.00	10,683.00	9,535.73
Iroquois River.....	227.80	1 66' thro. pl. gr. span.....	Dominion Bridge Co.	97,000	1.39	11,700	47.00	4,808.00	4,207.76
Madawaska River.....	230.20	1 99', 1 83'-6" thro. pl. gr. spans.	" "	336,000	4.39	26,000	47.00	15,972.40	13,833.20
Over Ning Ferry Road.....	230.30	1 33' thro. pl. gr. span.....	" "	34,000	1.625	7,200	47.00	1,910.90	1,600.43
Baker Brook.....	243.80	1 80' dk. pl. gr. span.....	W. P. McNeil & Co.	93,000	3.89	13,000	42.00	4,163.70	4,183.16
Under Ning Highway at Baker Lake	251.50	1 40' thro. pl. gr. span.....	Dominion Bridge Co.	20,000	1.94	3,700	52.00	1,180.40	444.31

DISTRICT 'B'.

Kitchen Brook.....	257.15	1 33' thro. pl. gr. span.....	Dominion Bridge Co.	33,000	1.15	6,950	52.00	1,730.90	299.68
Narrows Lac Long	265.45	1 66' thro. pl. gr. span.....	" "	96,000	3.97	11,050	52.00	4,885.80	1,300.59
Blue River.....	277.45	4 80' dk. pl. gr. and 1 150' dk. truss span.....	" "	735,000	4.34	62,000	49.00	34,937.00	32,011.88
Nigger Brook.....	283.45	1 55' thro. pl. gr. span.....	" "	72,000	4.15	9,700	52.00	3,492.40	905.04
St. Francis River.....	286.45	2 55', 1 99' thro. pl. gr. span.....	" "	340,000	4.29	29,800	52.00	16,135.60	3,605.53
Boucanne River.....	293.25	1 150' dk. truss, 4 60', 3 56', 2 40', 5 30' dk. pl. gr. spans and 5 towers 30' and 2 towers 40' spans.	" "	1,742,000	4.56	106,000	52.00	84,947.20	15,935.67
Rochue River.....	300.95	1 35' dk. pl. gr. span.....	" "	25,000	3.95	7,200	52.00	1,361.90	11.16
Fouchue River.....	305.80	1 30' dk. pl. gr. span.....	" "	21,000	3.95	6,600	52.00	1,172.70	0.00
Little Black River	312.95	1 55' thro. pl. gr. span.....	" "	72,000	4.15	9,700	52.00	3,492.40	907.90
Manie River.....	316.95	1 50' dk. pl. gr. span.....	" "	48,000	3.95	9,000	52.00	2,364.00	536.38
River du Loup.....	323.45	2 60', 1 80' dk. pl. gr. spans.....	W. P. McNeil & Co.	209,400	4.20	31,000	52.00	10,406.80	3,633.48
River eau Chaude.....	332.70	1 60' dk. pl. gr. span.....	" "	58,500	4.06	10,300	52.00	2,910.70	942.19
Outlet L. Therrien.....	341.15	1 77' thro. pl. gr. span.....	" "	119,000	4.25	12,400	52.00	5,702.30	2,281.55
Bras d'Apic, E. Br.....	369.45	1 60' dk. pl. gr. span.....	" "	58,500	4.06	10,300	52.00	2,910.70	905.80
Bras d'Apic, W. Br.....	370.45	1 60' dk. pl. gr. span.....	" "	58,500	4.06	10,300	52.00	2,910.70	938.92
Mechant Pouce.....	375.45	1 60' dk. pl. gr. span.....	" "	58,500	4.06	10,300	52.00	2,910.70	774.23
Fortins Creek.....	375.95	1 60' dk. pl. gr. span.....	" "	58,500	4.06	10,300	52.00	2,910.70	1,053.00

SESSIONAL PAPER No. 37

Bras St. Nicholas. Fourche du Pin.	380-45 396-45	1 33' thro. pl. gr. span. 2 70' dk. pl. gr. and 1 125' dk. truss spans.	"	33,000	4-26	6,900	52 00	1,764 60	548 68
Abenakis River.	415-25	1 100' and 2 60' dk. pl. gr. spans.	Dominion Bridge Co.	420,000	4-47	35,700	52 00	20,630 40	2,718 23
Etchemin River.	421-09	2 100' and 2 70' dk. pl. gr. spans.	W. P. McNeil & Co.	280,000	4-27	39,200	48 00	13,837 60	6,792 90
Over Ning Q.C. Railway.	433-50	1 66' thro. pl. gr. span.	Dominion Bridge Co.	446,400	4-72	50,400	55 00	23,842 08	24,008 72
River le Bras.	446-61	1 66' thro. pl. gr. span.	"	64,800	4-72	12,000	55 00	3,718 56	5,869 37
Creek at Mile 13.2	447-25	1 40' dk. pl. gr. span.	"	64,800	4-72	12,000	55 00	3,718 56	1,234 44
Under Ning I.C. Railway.	457-88	1 88' thro. pl. gr. span.	"	30,000	4-70	7,800	53 00	1,823 40	360 83
Highway Viaduct.	458-28	1 50', 2 40' dk. pl. gr. span.	"	150,000	4-72	13,800	55 00	7,839 00	7,164 34
Cap Rouge Highway, Swing.	463-05	1 89' 2" thro. truss, swing span.	"	46,000	4-72	12,200	55 00	2,842 20	1,783 51
Cap Rouge Viaduct.	463-05	32 40', 27 61' dk. pl. gr. spans. 1 125', 1 150', 1 160' dk. truss spans, 30 towers 40' span and 1 rocker bent.	"					2,200 00	2,200 00
River aux Pommes.	479-95	1 50' dk. pl. gr. span.	"	8,456,297	3-94	613,122	42 00	358,929 22	362,329 22
Jacques Cartier R.	482-45	2 30', 2 60', 1 80' dk. pl. gr. spans, 1 100' dk. truss span, 2 towers 30' span and 1 rocker bent.	"	46,200	4-04	9,500	47 00	2,312 98	2,314 24
Portneuf River.	439-35	2 60' and 1 100' dk. pl. gr. span.	"	705,000	4-19	52,900	50 00	32,184 50	33,659 73
Grand Bras d'Arne.	499-35	1 40' dk. pl. gr. span.	"	265,430	4-09	31,420	47 00	12,332 82	12,332 83
Lachevriere River.	500-35	1 33' thro. pl. gr. span.	"	31,300	4-44	7,800	52 50	1,799 22	1 693 43
St. Anne River.	503-95	2 70' and 2 100' dk. pl. gr. spans.	"	37,900	4-84	7,000	52 50	2,201 86	1,778 88
River Noire.	505-95	2 50' dk. pl. gr. spans, 1 125' dk. truss span.	"	470,000	4-09	47,600	47 00	21,460 20	18,317 84
Nigerette River.	506-45	1 30' dk. pl. gr. span.	"	353,000	4-18	31,000	47 00	16,212 40	18,743 65
Charest River.	511-15	4 30', 1 45', 3 60', 1 75' dk. pl. gr. spans and 4 towers 30' span.	"	21,000	4-44	6,500	52 50	1,273 65	1,028 00
Ratiscan River.	525-75	2 40', 3 60' dk. pl. gr. span, 2 towers 40' span.	"	641,728	3-95	57,342	50 00	28,215 36	34,109 33
Over Ning Public Road.	531-25	3 skewed gr. spans.	"	1,396,453	4-23	101,302	50 00	64,135 06	64,135 06
Tawachiche River.	543-45	1 44' thro. pl. gr. span.	"	33,277	4-72	7,200	47 00	1,909 07	1,909 07
Roberge Creek.	545-45	1 40' o. to o. d.t. thro. pl. gr. span.	"	50,000	4-84	8,800	52 50	3,291 35	2,926 72
R. des eaux Mortes.	555-45	1 125' dk. truss span.	"	93,600	4-84	16,000	52 50	5,370 24	5,442 79
River du Milieu.	557-45	5 40', 6 60', 3 75', 2 90' dk. pl. gr. spans, 1 225' dk. truss span, 2 towers 60' span, 5 towers 40' span.	"	279,000	5-12	19,000	52 50	15,282 30	19,604 25
1st Ning Brochet River.	559-45	1 60' dk. pl. gr. span.	"	3,006,000	4-93	170,000	52 50	157,120 80	176,654 17
2nd Ning Brochet R.	561-95	1 55' thro. pl. gr. span.	"	58,500	4-44	10,300	52 50	3,138 15	3,152 99
3rd "	562-45	1 55' thro. pl. gr. span.	"	72,000	4-44	9,700	52 50	3,706 05	3,774 64
4th "	568-95	1 33' thro. pl. gr. span.	"	72,000	4-44	9,700	52 50	3,706 05	3,750 49
5th "	570-05	1 36' 10" o. to o. thro. pl. gr. span.	"	33,000	4-44	7,000	52 50	1,832 70	1,848 20
Creek a Beauce.	575-45	1 40' dk. pl. gr. span.	"	64,800	4-44	7,200	52 50	3,255 12	3,025 58
Over Ning Q. & L. St. J. Ry.	578-70	1 76' o. to o. thro. pl. gr. span.	"	32,800	4-44	7,800	52 50	1,865 82	1,848 51
Little Bostomais R.	579-45	2 60' and 1 100' dk. pl. gr. spans.	"	120,032	4-84	11,340	52 50	6,404 90	6,404 90
Big Bostomais R.	585-15	1 90' dk. pl. gr. spans.	"	287,400	4-84	55,400	52 50	15,768 66	16,877 10
Croche River.	588-15	2 90' skewed thro. pl. gr. spans, 2 90' thro. pl. gr. spans skewed at one end only.	"	519,204	4-84	51,882	52 50	27,853 27	27,853 28
			"	674,266	4-84	41,027	52 50	34,788 39	34,788 39

STATEMENT showing Approximate Cost of Steel Bridges and Amounts Paid on Contracts to March 31, 1911.

DISTRICT 'B'—Continued.

Name.	Through Mileage.	Description.	Contractor.	Estimated Weight of Steel in Pounds.	Rate per Pound.	Timber.	Rate per M. ft. B.M.	Total Esti- mated Cost of Super- structure.	Paid to March 31, 1911.
1st Xing St. Maurice River.	589.05	6-140' thro. truss spans.	Dominion Bridge Co.	1,951,535	4.98	116,080	52.50	103,280.64	103,280.64
River au Lait	589.35	1-77' thro. pl. gr. span.	"	122,719	4.84	12,450	52.50	6,593.22	6,593.22
Vermillion River.	605.45	3-40', 2-60', 1-80' dk. pl. gr. spans, 2-125', 2-225' dk. truss spans, 3 towers 40' span.	"	2,600,000	4.22	139,500	48.00	116,416.00	122,555.05
Flamand River.	626.45	1-175' thro. truss span.	"	460,000	4.43	24,800	51.00	21,642.80	13,593.96
Little Flamanand River.	634.95	2-55', 1-99' thro. pl. gr. spans.	"	328,000	4.27	29,400	51.00	15,505.00	8,939.73
2nd Xing St. Maurice River.	648.45	3-200' skewed thro. truss spans.	"	1,695,000	4.27	81,200	51.00	76,517.70	76,321.21
3rd Xing St. Maurice River.	655.85	3-200' skewed thro. truss spans.	"	1,695,000	4.27	78,600	51.00	76,385.10	62,736.72
Manuan River.	657.63	3-180' skewed thro. truss spans.	"	1,440,000	4.27	71,100	51.00	65,114.10	41,304.13
1st Xing Ribbon River.	658.33	2-150' thro. truss spans.	"	730,000	4.30	40,800	51.00	33,470.80	19,680.80
Atikmahik Creek	662.33	8-60' and 7-30' dk. pl. gr. spans and 7 towers 30' span.	"	920,000	4.22	96,000	51.00	43,720.00	41,263.05
Minachin Creek.	680.23	1-44' thro. pl. gr. span.	"	51,000	4.39	6,750	54.00	2,603.40	
2nd Xing Ribbon River.	681.55	1-150' thro. truss span.	"	370,000	4.50	21,500	50.00	17,725.00	
E. Br. Gatineau River.	709.13	2-70' dk. pl. gr. spans.	"	148,400	4.34	18,350	54.00	7,431.46	
Marten River.	709.63	9-55' and 8-30' dk. pl. gr. spans and 8-30' towers.	"	970,000	4.32	97,900	54.00	47,190.60	

DISTRICT 'C'.

Peter Brown Creek.	878.99	1-100' dk. pl. gr. span.	Canadian Bridge Co.	149,000	4.68	14,000	54.00	7,729.00	
Harricanaw River.	887.93	1-300' thro. truss span.	"	1,200,000	4.93	38,000	54.00	61,212.00	
Nawapitchin Forks Viaduct.	904.73	4-60', 3-40' dk. pl. gr. spans, and 3-40' towers.	"	403,000	4.96	48,000	54.00	22,581.00	
Deer River.	913.83	1-66' thro. pl. gr. span.	"	96,000	4.96	8,800	54.00	5,237.00	
Robertson Lake.	915.13	1-77' thro. pl. gr. span.	"	119,000	4.96	10,000	54.00	6,442.00	
Kakameonan River.	922.63	2-50' and 1-90' dk. pl. gr. spans.	"	216,400	4.64	25,600	54.00	11,423.00	
Molesworth River.	931.13	1-150' thro. truss and 2-40' dk. pl. gr. spans.	"	425,000	4.96	29,800	54.00	22,689.00	
3rd Xing South River.	940.83	1-60' dk. pl. gr. span.	"	58,500	4.72	8,000	54.00	3,193.00	
Whitefish River.	942.13	1-275' thro. truss span.	"	1,000,000	4.93	35,000	54.00	51,190.00	

Okikodasik River.....	956.73	1-200' thro. truss span and 2 80' dk. pl. gr. spans.	"	"	744,800	4.88	46,000	54.00	38,830.00	20,215.04
DISTRICT 'D'.										
Circle River.....	987.37	1-200' thro. truss span.....	Can. Br. Co.....	560,000	4.35	27,900	50.00	25,755.00	20,215.04	
Low Bush River	987.62	1-200' thro. truss span.....	"	560,000	4.35	27,900	50.00	25,755.00	19,734.05	
Mistongo River.	1,002.12	11-30', 11-60', 1-80' dk. pl. gr. spans, 11 towers 30' span.	Ham. B. W. Co.....	1,558,000	3.58	114,100	51.00	63,125.50	65,867.04	
Sucker Creek.....	1,010.68	1-30' dk. pl. gr. span.....	"	21,000	4.75	6,570	58.00	1,378.56	106.38	
Abitibi River	1,020.12	4-30', 2-57'-10", 3-60' dk. pl. gr. spans, 2-210' dk. truss spans, 4 towers 30' span & 1 rocker bent.	"	2,326,000	3.86	113,600	50.50	95,520.40	88,734.13	
Brule Creek	1,024.12	1-60' dk. pl. gr. span.....	"	58,500	1.70	10,300	51.00	3,274.80	2,297.12	
Frederickhouse River.....	1,034.41	3-40', 5-60' dk. pl. gr. spans, 1-200' dk. truss span, 3 towers 40' span.	"	1,126,000	4.60	84,600	51.00	56,110.60	60,841.77	
Buskegow River	1,038.60	2-60', 1-90' dk. pl. gr. spans.....	"	241,000	4.60	31,400	51.00	12,687.40	12,344.39	
Driftwood River.....	1,048.62	2-50', 1-100' dk. pl. gr. spans.....	"	241,500	4.60	29,300	51.00	12,603.30	12,213.42	
Mattagama River.....	1,060.12	2-260' thro. truss spans.....	Can. Br. Co.....	1,800,000	4.30	68,300	50.00	80,815.00	75,878.53	
Poplar Rapids River.....	1,066.62	2-50' & 1-70' dk. pl. gr. spans.....	Ham. B. W. Co.....	167,000	4.55	24,400	53.00	8,891.70	8,987.12	
Wellington Creek.....	1,074.37	1-70' dk. pl. gr. span.....	"	72,000	4.55	11,600	53.00	3,890.80	3,939.48	
Ground Hog River.....	1,078.62	2-250' thro. truss spans.....	Can. Br. Co.....	1,690,000	4.57	66,000	54.00	80,797.00	60,017.60	
Brule Creek.....	1,081.12	1-55' thro. pl. gr. span.....	Ham. B. W. Co.....	72,000	1.75	9,700	58.00	3,982.60	1,192.01	
Marten Creek.....	1,083.12	1-35' dk. pl. gr. span.....	"	25,000	4.75	7,200	58.00	1,605.10	163.53	
Bass River.....	1,093.72	1-55' thro. pl. gr. span.....	Can. Br. Co.....	72,000	4.96	8,300	54.00	4,019.00	.....
Kapuskasing R. E. Br.	1,098.12	2-100' dk. pl. gr. spans.....	"	298,000	4.55	27,600	54.00	15,049.00	.....
Kapuskasing R. W. Br.....	1,098.12	3-100' dk. pl. gr. spans.....	"	447,000	4.55	41,200	54.00	22,564.00	.....
Lost River.....	1,106.72	1-100' dk. pl. gr. span.....	"	149,000	4.61	14,000	54.00	7,625.00	.....
Solomon Creek.....	1,112.12	1-30' dk. pl. gr. span.....	"	21,000	1.82	4,305	54.00	1,244.00	.....
Opazitka River.....	1,119.12	1-200' thro. truss span.....	"	560,000	4.93	25,600	54.00	28,930.00	.....
Montcalm Creek.....	1,123.42	1-44' thro. pl. gr. span.....	"	70,000	1.96	4,700	54.00	3,726.00	.....
Crow Creek	1,129.12	1-44' thro. pl. gr. span.....	"	51,000	4.96	6,100	54.00	2,859.00	.....
Missinabi River.....	1,138.82	7-100' & 2-80' dk. pl. gr. spans.....	Ham. B. W. Co.....	1,227,800	4.41	117,700	54.50	60,561.00	.....
McIlwath Creek.....	1,154.12	1-50' dk. pl. gr. span.....	Can. Br. Co.....	46,200	4.76	7,400	54.00	2,599.00	.....
Mattawishqua River.....	1,155.87	2-40', 2-90' & 2-100' dk. pl. gr. spans.	"	457,000	4.61	49,270	54.00	23,729.00	.....
Nelles Creek.....	1,167.12	1-40' dk. pl. gr. span.....	"	30,000	4.76	5,660	54.00	1,734.00	.....
Valentine Creek	1,172.12	2-50' & 1-80' dk. pl. gr. spans.....	"	184,800	4.68	23,500	54.00	9,918.00	.....

DISTRICT "F."										
Sturgeon River.....	1522.04	1-220' thro. truss span	Canadian Bridge Co.	660,000	4.67	30,500	50.00	32,347.00	29,837.64	
"	1547.54	3 D.T. skewed thro. truss spans..	" ..	2,190,000	4.67	102,000	50.00	107,373.00	42,067.15	
Sioux Lookout River	1554.49	1-88' thro. pl. gr. span and 1-175' thro. truss span	" ..	620,000	4.67	36,400	50.00	30,744.00	17,659.12	
1st Xing Edith Creek.....	1587.29	1-24'-4" o to o dk. pl. gr. span....	Canada Foundry Co.	13,500	5.07	5,700	43.00	958.05	1,045.46	
2nd "	1587.69	1-24'-4" o to o dk. pl. gr. span...	" ..	13,500	5.07	5,700	48.00	958.05	1,045.46	

STATEMENT showing Approximate Cost of Steel Bridges and Amounts Paid on Contracts to March 31, 1911
DISTRICT 'F'—Continued.

Name.	Through Mileage.	Description.	Contractor.	Estimated Weight of Steel in Pounds.	Rate per Pound.	Timber. l. ft.	Rate per M. ft. B.M.	Total Esti- mated Cost of Super- structure.	Paid to March 31, 1911.
Wabigoon River.....	1626.29	2 40' and 1 93' o to o dk. pl. gr. spans.....	Canadian Bridge Co.	182,832	5.70	27,000	50 00	11,771 42	11,776 42
Creek Crossing.....	1662.29	1 20'-4" o to o thro. pl. gr. span....	Canada Foundry Co.	22,000	4.90	4,800	48 00	1,308 46	1,207 34
".....	1672.54	1 20'-4" o to o thro. pl. gr. span....	" "	22,000	4.90	4,800	48 00	1,308 40	1,207 34
Macfarlane River.....	1684.29	1 100' dk. pl. gr. span.....	" "	160,000	4.70	16,300	48 00	8,302 40	6,683 92
Winnipeg River.....	1689.29	1 100' dk. pl. gr. span.....	Canadian Bridge Co.	146,450	5.70	59,900	50 00	93,873 76	93,822 21
".....	1713.04	1 20' 4" o to a thro. pl. gr. span....	" "	1,196,103	6.90	.....	.....	.....	.....
Creek Crossing.....	1735.89	2 50' dk. pl. gr. and 1-78' thro. pl. gr. spans.....	Canada Foundry Co.	22,000	4.90	4,800	48 00	1,308 40	1,207 34
Over Ning C. P. R.	1748.79	2 90' dk. pl. gr. spans.....	Canadian Bridge Co.	228,396	5.70	26,636	50 00	14,350 03	14,350 03
Whitemouth River.....	1763.69	1 90' thro. pl. gr. span.....	" "	231,474	5.70	27,812	50 00	14,584 62	14,584 62
Brokenhead River E. Br.	1770.29	1 60' dk. pl. gr. span.....	" "	173,989	5.70	12,603	50 00	10,547 52	10,547 52
" W. Br.	1802.15	1 55' d. t. pl. gr. span.....	" "	98,502	5.70	9,250	50 00	6,077 11	6,077 11
Over Ning Highway.....	1802.35	1 55' d. t. pl. gr. span.....	" "	130,000	4.40	Concrete \$23.00 per l. ft.	.....	7,031 00	2,736 58
Over Ning Russell St.	1802.65	1 100' d. t. Pony truss span 4-31'-9" ; 1-67' d. t. pl. gr. spans and 2 towers 31'-9" spans.....	" "	130,000	4.40	Concrete \$23.00 per l. ft.	.....	7,031 00	2,279 07
Over Ning Archibald St.	1802.75	1 81' d. t. pl. gr. span.....	" "	840,000	4.60	61,000	52 00	41,812 00	15,944 85
Seine River.....	1802.95	1 100'. 4-50' and 2-30' dk. pl. gr. spans, 2 towers 30' span.....	" "	220,000	4.40	Concrete \$23.00 per l. ft.	.....	11,589 00	4,263 71
Over Ning Highway.....	1803.09	1 71' 8" d. t. dk. pl. gr. span.....	C. B. & E. Co.....	866,000	4.55	94,000	52 00	44,291 00	13,809 06
Over Ning C.N.R.	1803.34	viaduct.....	" "	148,000	4.50	14,800	40 00	7,252 00	.....
Subway St. Joseph St.	1803.85	1 71' d. t. dk. gr. span.....	Canadian Bridge Co.	607,000	4.50	62,500	40 00	29,815 00	.....
" Tache Avenue.....	1803.94	1 71' d. t. dk. pl. gr. span.....	Dominion Bridge Co.	182,000	4.40	Concrete \$23.00 per l. ft.	.....	9,687 00	3,397 07
Red River.....	1803.95	1 4 150' thro. truss 1 lift span viaduct etc.....	" "	5,000,000	4.30	341,000	35 00	245,145 00	184,435 00
Over Ning C.N.R.	1803.94	1 55' 4" d. t. thro. pl. gr. span....	Dominion Bridge Co.	61,000	11 00	.....	.....	.....	.....
				170,000	4.30	10,400	35 00	7,674 00	.....

SESSIONAL PAPER No. 38

After laying up the steamer and at the request of the persons using Aliberton Harbour, P.E.I., Capt. Anderson was detailed to make examination of the entrance of that harbour. This he did and reported on December 5

After this he was sent to report upon a rock in Souris Harbour, P.E.I., which he did on January 28, upon his return to Ottawa.

ATLANTIC COAST.

This survey is in charge of Commander I. B. Miles, who was assisted by Messrs. G. C. Venn, and Henry Ortiz. Mr. Savary was detached for survey of Fort Churchill, Hudson Bay. Upon the opening of navigation the survey was transferred from the old steamer *La Canadienne* to the new steamer *Cartier*, which arrived at Quebec from the builders Messrs. Swan, Hunter and Wigham Richardson of Newcastle-on-Tyne on May 6. She is a twin screw steamer of 522 tons register, 163 feet long between perpendiculars, 29 feet moulded breadth and 15½ feet deep. She is steel double bottom throughout, has two Scotch boilers with Howden's forced draught and has a speed of about 12 knots. She is equipped with electric light, carbonic dioxide cold storage for meats and vegetables, has gasoline launches and latest style of surveying gigs. So far she has given the greatest satisfaction, is economical of fuel, is a splendid sea boat and furnishes comfortable quarters for officers and crew and for the surveying work. She cost \$176,912.

After docking and the usual cleaning up and painting after the trans-Atlantic trip, the vessel, with party on board, left Quebec on May 31, and spent the season surveying in the vicinity of Rimouski, working out from the point at which work stopped in the autumn of 1910. The river is now charted as far as Bic Island and a new chart embracing the water from White Island to Bic Island will be issued during the season of 1911. The officers and crew of *La Canadienne* were transferred to the *Cartier* and the former laid up for the season at Sorel.

On July 1, Commander Miles left the *Cartier* in charge of Mr. Venn to assume Command of the expedition to Hudson Bay and returned August 17, having successfully placed the parties at Fort Churchill and Port Nelson (report on the trip is appended).

The *Cartier* returned to Quebec on November 1, and went immediately into winter quarters. She required very little work upon her. The ship's officers, Capt. McGough and Chief Engineer D. Marcotte, have again shown their usual zeal.

PACIFIC COAST.

This survey is under the command of Captain P. C. Musgrave, who was assisted by Messrs. F. P. V. Cowley, L. H. Davies, C. C. Ross and W. H. Powell, using the steamer *Lillooet* as a base. Mr. Parizeau was detached for survey work at Nelson River, Hudson Bay. The party left Victoria on April 5, and reached Prince Rupert on April 10.

A party under Mr. Cowley was immediately placed in camp on Lewis Island for the purpose of surveying Arthur Passage and Ogden Channel, as these waters are well sheltered and the work can be more economically carried out in this way than from a steamer.

Captain Musgrave and the balance of the party were engaged about the north side of Queen Charlotte Islands, during the spring and autumn in Masset Inlet, and during the fine weather of summer, sounding the eastern end of Dixon Entrance, between Rose Spit and Celestial Reef, or the large area which Captain Parry of the Admiralty Surveying Service was unable to complete in 1908. This was completed, but the western approach to the entrance outside the fringe about three miles wide off North Island, still remains to be done. Whilst this is supposed to be all deep, there is a reported danger well out and it will be necessary to use up a lot of time in an

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examination of the locality. For this, it is proposed to take the heart of the fine weather of several seasons and have the work done before the trade to Prince Rupert becomes very extensive.

The examination of Masset Inlet, Queen Charlotte Islands, shows it to be a large lake of about sixty square miles area, connected with Dixon Entrance by a narrow channel twenty miles long, but deep enough for any vessel that can cross the bar at the mouth. The lake has many islands and shoals in it, but it can be made very useful. A chart of the inlet is now in the engraver's hands. At the end of the season Messrs. Cowley, Ross and Powell resigned, and were replaced by Messrs. O. Parker and R. L. Fortier.

The officers of the ship, Capt. Griffith, and Messrs. Allen and Borrowman, Engineers, gave the work their usual keen attention, thus aiding the surveying staff very materially, and without which progress would not have been very rapid. I regret to add that Mr. Allen, after three years service, accepted better employment and left us in April, 1911.

LAKE OF TWO MOUNTAINS.

This survey was continued and concluded under Mr. A. J. Pinet, assisted by Mr. St. Pierre. For the purpose he was provided with a house-boat and steam launch, and completed the work between St. Anne de Bellevue and Carillon early in August. The chart has been drawn and is now in the hands of the printer for engraving.

LAKE ST. FRANCIS.

Upon the completion of the work in Lake of Two Mountains, the house boat, steam launch and party were transferred to Lake St. Francis at Cornwall, and placed in charge of Mr. C. McGreevy, assisted by Messrs. St. Pierre and Ed. Jodoin, for the purpose of completing the work of surveying the upper end of that lake. This was continued until the end of the season, November 24, when the fleet was laid up in the Cornwall canal. There still remains some examination of suspicious soundings in the lake to be completed in 1911, when the publication of the charts will be placed in the hands of the engraver.

HUDSON BAY.

Owing to the proposal to build a railway from some point in the Canadian Northwest to Hudson Bay, this survey was instructed to make an examination of Ports Nelson and Churchill with a view to reporting upon them as desirable termini for railways, or rather whether or not they can be made ports to be used with safety by ocean-going vessels.

For this purpose two parties were organized, one under Mr. A. G. Bachand assisted by Mr. Chas. Savary, both assistants of several years standing and experience on this survey, to go into camp at Fort Churchill and were provided with the necessary launch and boats for work. The other was under Mr. H. D. Parizeau, assisted by Mr. Robt. Fraser, also assistants of several years standing and experience on this survey. These officers, on account of the nature of the approach to the harbour, were provided with a three masted schooner, launch and boats. For transporting these parties to the localities the Department of Marine and Fisheries kindly loaned us the ice-breaking steamer *Stanley* which was placed in charge of Commander I. B. Miles. He had as Officers, Captain Dalton, of the *Stanley* and Captain S. W. Bartlett, one of the best known pilots for Hudson Strait.

He furnishes the following interesting report on the trip, particularly on the ice conditions met with:—

'Ice conditions. Great numbers of icebergs were met with along the Labrador coast. These bergs are reported by fishermen to be much more numerous from the coast to 20 or 30 miles off than farther out. Probably the best course for a vessel, making from Newfoundland to Cape Chidley, would be about 50 miles off the land.

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Cape Chidley was rounded and Gray Strait entered at noon on July 18, the ship anchoring in Port Burwell at 3 p.m. the same day.

Port Burwell and the bays along the coast were found to be quite clear of ice, but in Ungava Bay, as far as could be seen from aloft, the ice appeared solid. From information obtained from the Mission at Port Burwell, this field has been held in Ungava Bay by a long period of light northerly winds. It also appears that this year the ice in Burwell and adjacent bays had broken exceptionally early (about July 10), but as a rule it may be taken that it is impossible to enter these harbours till the last few days of July. In 1909, on the day corresponding to that on which I entered Port Burwell, dog teams were still crossing the harbour on the ice.

On leaving Port Burwell, July 19, heavy field ice was encountered at a distance of about 30 miles. This had apparently set out from Ungava Bay and drove the ship a considerable distance north toward Resolution Island. The extent of this field was about 60 miles, after which a sheet of comparatively clear water was passed through until 10 p.m. of July 20, when very heavy ice was met with. This kept the ship to the southward and made it necessary to abandon any idea of making Ashe Inlet.

In the opinion of Captain Bartlett this was Arctic ice, being much heavier and dirtier than that from Ungava Bay.

This pack appeared to be continuous from the northward to within a couple of miles of the southern shore of Hudson Strait (Cape Prince of Wales to Digges Island), a narrow passage along the shore being apparently kept fairly clear by tidal streams.

After a short spell of clear water off Cape Digges, about 40 miles of heavy ice drove the vessel toward Nottingham Island.

Mansel Island having been passed, the southern point of Coats Island was steered for and course set for Churchill.

Towards evening on July 22, the ship struck the outer edge of the largest ice field met with on the whole voyage. This, for a distance of about 200 miles, was continuous. This ice was not very heavy for a vessel specially constructed, but called for considerable skill on the part of Capt. Bartlett, the ice pilot, in finding leads.

There being no indication of clear water on either side it was resolved to make as direct a course as possible. The ship was seldom stopped, but was heavily shaken by the continuous pounding necessary to force her way through.

This field was suddenly cleared on the morning of July 24, and Churchill was reached the same night without further delay.

Churchill and Nelson having been visited, the vessel left the latter place on the evening of July 30, on the homeward voyage. Within a few hours of leaving Nelson the heaviest ice yet met was encountered, and for about 90 miles very slow headway was made. This having been cleared, nothing but light ice was met, either in the Bay or Strait, until after leaving Port Burwell. Whilst at anchor at Port Burwell awaiting the arrival of the *Earl Grey*, the ice set out of Ungava Bay before a moderate southerly breeze, and Burwell Harbour was completely filled. The ice was, of course, loose but made boat work impossible at times.

Port Burwell was left upon August 9, and within an hour the ship for the first time encountered ice that stopped her. This had evidently been heavily packed in slack water, the flood carrying its own ice to meet that returning through Gray Straits on the ebb. When the strength of the tide made itself felt, the ice holding the ship was loosened and by keeping close along the southern shore of Gray Strait, Cape Chidley was rounded and course set for southward. The pack was apparently very heavy up to the Button Islands.

Very few bergs were seen on the return along the Labrador coast.

Whilst numerous bergs were met with in the eastern part of Hudson Strait, none were seen in Hudson Bay itself, and Capt. Bartlett informed me they are practically unknown there.

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It would appear from the above remarks that vessels may expect to meet ice from Cape Chidley to Churchill, but Capt. Bartlett's opinion was to the effect that our experience was exceptional, and that a long spell of light winds had contributed to the packing of the ice. Personally, I cannot see why this should be so, as the ice forms and breaks away year by year, some years (as the present, 1910) exceptionally early, no doubt, but it must be met some time during the navigation season. Long spells of wind in one direction might hold it in the bays and inlets for some time, but it is not likely that these winds would be so continuous as to keep it there until frozen in again. Therefore, any vessel navigating the Bay must be prepared to meet ice. Whilst none of that met with on this voyage could have been dangerous to the *Stanley*, or sealers and other specially constructed vessels now trading in the district, I am of the opinion it might be dangerous to a ship not so built. I certainly do not think any cargo vessel of ordinary construction would have been able to find or force her way through the large field met before Churchill, but would have been obliged to remain in the ice until it was loosened by winds or currents.

Under the weather conditions which prevailed whilst the *Stanley* was in the Bay, a ship might wait an indefinite period for the ice to open up again. In the event of a strong breeze which would eventually disperse it, the preliminary would be a heavy packing to leeward, which might jeopardise the vessel.

Throughout the above remarks 'ice' is to be taken to mean ice fields and not bergs.

WEATHER CONDITIONS.

The *Stanley* was exceptionally fortunate in weather while in Hudson Bay and Strait, nothing more than a moderate breeze being experienced. But, as a general rule, in the Strait and Bay proper, no lasting heavy weather need be anticipated during July and August, although in the vicinity of Nelson River, heavy 'northers' in August are reported by the Hudson Bay vessels, sometimes lasting from 36 to 48 hours.

A considerable amount of fog was met with, which would be expected with the light winds prevailing during the voyage. This fog was usually in the vicinity of ice, but not necessarily so.

Temperatures in the Bay and Strait were not low, the air averaging between 31° and 40° F., sea water between 30° and 40° F.

Owing to the uniform temperature of the water, little can be judged from this as to the vicinity of ice. This was also noticed after clearing the Straits of Belle Isle, that is to say, that the colder currents having been entered, the proximity of even large bergs made little difference to the temperature of the water.

GENERAL NAVIGATION.

Apart from the ice question which it will be seen is by no means insurmountable, the dangers and difficulties of the navigation of Hudson Strait and Bay arise chiefly from the inaccuracies of the charted positions of the salient points, and from the proximity of the magnetic pole, with the consequent effect on compasses.

As the whole of the Hudson Bay chart appears to be more or less in the nature of a sketch or running survey, great caution would naturally be exercised by the ship masters in making land.

From my experience on this voyage, the land and islands are in some cases 15 to 20 miles out of longitude. This may be modified when I have reworked the many observations taken, but in any case it would be unwise to attempt to make any land except in daylight and clear weather.

The Button Islands, southern shore of Gray Strait, and the land between Cape Prince of Wales and Digges Island, as shown on chart, bear little resemblance to the actual coast. King and Joy Islands do not exist, and Charles Island lies much closer to the mainland than the chart shows.

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I would have endeavoured to run a line of soundings on the outward voyage, but having a schooner in tow, and being so beset by ice, this was impossible. When able to do so on the return from Port Nelson to Cape Digges, I ran an almost continuous line, soundings being taken at intervals of 10 miles in deep water, and 5 miles in shoaler water.

COMPASSES.

As regards the great 'bugbear' of Hudson Bay navigation, the reported local attraction and inaccuracy of the compass, I found nothing to justify this evil reputation. In one or two places only, and when in close proximity to the high land (Cape Chidley and Cape Digges, for instance) I found a deviation of two or three degrees from the normal. Whilst in southern waters, Halifax and Strait of Belle Isle, I had very carefully adjusted the compass of the *Stanley*, which was excellently placed as far as the ship's magnetism was concerned, and had reduced the error due to ship to such small amounts that almost the whole of the compass 'error' found by observation in the Bay could be accepted as due to variation, as opposed to deviation.

Being exceptionally fortunate in having clear sun and stars, my observations for error were almost hourly, and showed that the change of variation, though rapid, was normal, but the lines of variation will not quite agree with those shown on Admiralty charts. For instance, the line of 'no variation' lies about 30 miles east of that shown on chart. As stated above the proximity of the magnetic pole (and consequent small value of horizontal force) renders the needle sluggish and an alteration of a few degrees in direction of the ship's course is not immediately shown by the compass.

As the chart stands at present, continuous observations for compass errors are necessary. This is only in accordance with the ordinary practice of seamen, and I think that when the lines of equal variation have been correctly charted (and positions rectified) no more difficulty will be found in the navigation by account than is experienced in the approaches to the Gulf of St. Lawrence, where the rapid change of variation necessitates hourly alterations of the course.

It may be remarked that a liquid compass was found to be almost useless, especially in the western portion of the Bay.

TIDES AND CURRENTS.

As far as could be observed from the high water marks along the coasts passed, the H. W. F. & C., was much as shown on chart. The many deviations from the course, made necessary to avoid ice, prevented any reliable data being obtained as to the set of the currents, except that, as would be expected, a strong tidal set was felt in and out of the bays and indentations of the coast. In Gray Strait the Spring tides are so strong that it is advisable to time the approach to pick up a favouring stream.

PORTS NELSON AND CHURCHILL.

Until the results of the detailed surveys are in, it is difficult to give an unprejudiced opinion as to the relative values of Fort Churchill and Port Nelson as ports, and I can only take the point of view of a master of a vessel making these places for the first time without local knowledge or pilot's assistance.

When making Port Churchill, having obtained good sights for latitude and longitude at 5 p.m. and later picking up soundings, I proceeded until 11 p.m. when the distance being run down, I hauled to the southward for the port. Fog came down and I anchored for the night. When the weather cleared about 10 a.m. the following day, the beacon at the entrance to Churchill Harbour was seen, the harbour easily entered and a comfortable anchorage picked up.

I give this detail to show the facility with which the port can be made.

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Churchill Harbour, although of not very great extent as it at present stands, appears to me to be adapted to easy enlargement, the eastern shore having good water close to. The entrance is narrow and I do not imagine any sea could get up that would inconvenience loading operations alongside wharfs, but the heavy tide and current from the Churchill River running against a strong breeze makes boat work difficult at times.

The land in the vicinity of Cape Churchill is rocky with stunted trees, the highest part of this land being about 100 feet above H. W.

The dangers shown on Admiralty chart No. 863 as being off Cape Churchill are locally stated to be much nearer the land.

Having left Churchill on July 27, I proceeded to Nelson Roads.

The land in the vicinity of Cape Tatnam and the western shore is very low, the summit of the trees being certainly not more than fifty feet above H. W. The ground on the approach to Port Nelson or York Roads was found to be very foul.

Four fathoms of water was picked up with no land in sight, and eventually anchored in nine fathoms in a position where the trees were only visible from aloft, and a beacon which is situated near the entrance to Hayes River and the summit of which is 80 feet above H. W., was just visible from the ship at a height of 40 feet above the water. Although only 80 feet high this beacon can be seen some time before any other sign of land is visible.

The day following my arrival, I ran with a launch to Hayes River and found that a drying flat of sand and boulders extends about three miles from the shore, less than 18 feet of water for a further four miles, and less than 30 feet for an additional three or four miles.

The current from the Nelson and Hayes Rivers is very swift, a great volume of water being discharged into Nelson Roads. When this current combines with an ebb tide and sets against the heavy northerly gales which prevail here in August and September, a very bad sea is raised, especially, as may be imagined, inside the five fathom line of sounding. The Hudson Bay vessels have found much difficulty in making, and holding, their positions in Nelson Roads and on more than one occasion have been obliged, after waiting some days for favourable conditions, to abandon all idea of discharging. They have then carried their cargoes on to Churchill, from whence it had to be drawn by dog teams during the winter. The usual procedure for the Hudson Bay vessels is to close the land as much as possible on the rising tide, and on their signals being observed by officials ashore, to steam out and anchor at a distance of about 18 miles and await the boats.

In August, 1909, one of these vessels experienced a northerly gale of 48 hours duration, during part of which time she was steaming full speed with both anchors down, with a heavy sea breaking on board. After remaining in the vicinity for ten days, and being unable to work, she proceeded to Churchill and there discharged her Nelson cargo.

After leaving Port Nelson anchorage I sounded my way out to the northeast and carried good water for some miles until, at an estimated distance of from 12 to 15 miles from Cape Tatnam, I suddenly picked up 10 fathoms and thought it advisable to haul due north. The ground in the vicinity of Cape Tatnam is reported locally to be as foul as that on the western side of Port Nelson.

As a result of Mr. Bachand's survey at Port Churchill, I beg to offer the following report:—

'Churchill Harbour is situated in latitude 48-56-10 N. and longitude 94-10 W. and about the middle of the west shore of Hudson Bay.

The approach to Churchill Harbour is very well marked and comparatively easily picked up. The first landfall (approaching from Hudson Strait) is Cape Churchill, which stands well out from the low west shore and contrast to the shore south of it, may be approached to within a comparatively short distance. From this Cape to the

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Harbour is a distance of 35 miles and a vessel may keep close enough to have the shore in full view until Eskimo Point and beacon at the entrance are made out.

This clear approach is important and in marked contrast to the approach to the whole shore from near Cape Churchill to James bay, which is fronted by a shallow band many miles wide.

The entrance to Churchill between the 18 foot contours is 1,100 feet wide and has as much as 90 feet of water in it with not less than 6 fathoms outside.

The harbour itself is in two parts, outer and inner, but the latter is so shallow as to be useless and injurious to the former, in that it furnishes a large area in which water is stored during flood tide to cause strong currents through the entrance at ebb tide.

The outer harbour or harbour proper is about 3,000 yards long north and south with an average width of 2,000 yards giving an area of one and a half square miles most of which, however, is very shallow. The area of water over 18 feet deep inside the entrance is about 1,600,000 square yards or about half of a square mile. The anchorage space is therefore not suitable for more than three or four vessels.

The East shore of the harbour is a long narrow point not over 40 feet high tapering from 3,000 feet at the inner and to a small rock at the entrance. For a distance of 6,000 feet from the entrance this point is fronted by a shallow band and a lane of water 700 feet wide over eighteen feet deep. If this harbour should be selected this would give an excellent site for sufficient slips and piers for a large traffic.

The west shore of the harbour is another point about 8,000 feet wide and terminating in a small island and the remains of old Fort Prince of Wales. This point is not considered so suitable for wharfs, piers and ships or railway yards.

Not being provided with the necessary apparatus, no borings of the bottom were taken, but as far as observed it is silt from the river.

TIDES.

The range of the spring tides is about 15 feet and the water rushes through this entrance with a velocity of 6 miles per hour on the ebb tide and $2\frac{1}{2}$ miles per hour on the flood. As remarked in the beginning of this report the inner harbour is very large and allows a large volume of water to be impounded furnishing a supply that must escape during the ebb and cause heavy currents. The harbours might be separated by a dyke and thus provide a wet basin above and cut off the supply for the strong currents at ebb tide.

SHELTER.

The entrance being narrow, no sea of any consequence can come in, but when northerly to northeasterly gales blow, some sea strikes the west shore for a short distance inside the entrance and creates an uncomfortable condition for vessels anchoring off the R.N.W.M.P. post, particularly with the ebb tide. A vessel anchoring closer under the eastern shore experiences little inconvenience from sea or tide, and in the situation suggested for the wharfs and piers a vessel would suffer none. The high winds will, of course, be felt as the shores are comparatively low and void of trees.

ICE.

In 1910 floating ice first appeared from the river on October 15, and the harbour was closed on December 5. The survey party reached Churchill on July 25, and no ice was seen afterwards; first snow appeared on September 9, but the season was reported to be an unusually short one.

As a result of Mr. Parizeau's survey at Nelson River I beg to offer the following report:—

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Port Nelson is situated approximately in latitude 57-03 north and longitude 92-35 west, or about 120 miles south of Port Churchill.

The work on the survey of Port Nelson was carried on during the season of 1910 from the three-masted schooner *Chrissie G. Thomey*, purchased in Newfoundland especially for the work. It was in command of Mr. H. D. Parizeau, who was assisted by Mr. R. F. Fraser. The crew consisted of Captain Thos. Gushue of Brigus, Newfoundland, and nine men.

Mr. Parizeau and party left Halifax on June 27, under orders to meet the steamer *Stanley* at Port Burwell and be towed to destination. The meeting took place on July 19, and the two vessels reached the outer anchorage off Port Nelson on July 28.

On the trip heavy ice was encountered and the vessels were unable to call at Ashe Inlet for magnetic observations as intended. A track was, however, discovered along the south side of Hudson Strait close to land and the Bay entered on the 22nd. Across the Bay heavy ice was found until within 70 miles of Port Churchill, after which no trouble was experienced.

At the present time anchorage is taken up at a great distance from shore. The Hudson Bay Company ships run in as close as possible on the high water to signal the post at York Factory and when seen they leave and anchor about 18 miles from Point Marsh.

Last season when approaching Nelson River to put the schooner on the station for her work, the steamer *Stanley*, with her in tow, ran into shallow water (4 fathoms) then moved out to 9 fathoms and fixed her position as 10 miles from land where nothing could be seen from the deck and only a few trees and the beacon on Marsh Point from the Crow's Nest.

After becoming acquainted with the locality and procuring a pilot the schooner was piloted at high water to an anchorage just off the position selected for the outer railway wharf.

Owing to the great difficulties encountered very little surveying that can be placed on paper was done. The greatest labour was necessary to get ashore with material for signals and owing to the low beach these had to be large and high that they might be seen a few miles off. The winds and seas were very heavy and in the exposed situation working from even a large well covered-in launch was impossible.

If very little of a definite nature was ascertained, a good deal of information that will be of material assistance next season was obtained.

At a point 15 miles from the beacon on Marsh Point and the same distance from Sam's Creek, there is a depth of only ten fathoms. The water towards the river gradually shoals and the river channel develops until at a point midway between Marsh Point and Sam's Creek, a bar is reached over which not more than 21 feet can be carried. Here the channel at low water is about 600 yards wide, the banks on either side drying at low water. Inside, the channel deepens again and continues for seven miles to the position selected for the outer wharf, where only 17 feet water can be found and the channel is about 600 yards wide.

Observations for tides show that springs rise 16 feet and neap 10 feet, and the tides flow and ebb at from 2 to 3 knots.

Of course, this information is all gathered from cruising about in bad weather, when circumstances made it impossible to fix one's position for transfer to paper and when the survey work is completed it may have a different appearance.

There is one thing certain that the survey is no child's play, the roadstead is exposed to every wind that blows and every sea that runs, the currents and cross currents are strong, the shores so low that nothing can be seen from boats and all locations must be determined from the previously ascertained position of the ship.

Ice began to form, coming down the river on one tide and up on the next, on October 31, and gradually became worse, each day making navigation more hazardous.

Until further and proper definite information is obtained, no opinion can be expressed as to the suitability of this port for a terminus.

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On September 12, it was decided to send the schooner to Halifax and continue the work from camp until the ice would render moving about dangerous.

The schooner therefore sailed, arrived at the western entrance to Hudson Strait on the 15th, and at the eastern entrance on the 21st, having experienced strong gales and snow storms and thick weather, almost all the way. Twelve icebergs were seen off Ungava Bay. The vessel reached Brigus, Newfoundland, on October 7.

The survey party including Mr. Parizeau and Mr. Fraser remained at camp until January 20, when they left for Winnipeg by dog train and arrived in Ottawa on March 4.'

During the year the following new charts have been issued:—

No. 103.—Copper Island to Lamb Island.

“ 98.—Goderich Harbour.

“ 202.—Razada Island to White Island.

“ 203.—Approaches to Saguenay River.

“ 303.—Tree Bluff to Kinahan Island.

“ 21.—Quebec Harbour.

A second edition of the following charts was also issued during the year.

No. 1.—Montreal to Longue Point..

“ 11.—Three Rivers to Becancour.

“ 15.—Cape Levrard to St. Emelie.

“ 16.—St. Emelie to Deschambault.

“ 101.—Head of Thunder Bay to Pigeon River.

“ 102.—Lamb Island to Thunder Cape.

“ 301.—Prince Rupert Harbour.

“ 50.—Lake St. Louis.

I have the honour to be, sir,

Your obedient servant,

WILLIAM J. STEWART,

Hydrographer, Department of the Naval Service.

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REPORT ON RADIO-TELEGRAPHIC SERVICE.

OTTAWA, April 1, 1911.

SIR,—I have the honour to submit herewith, annual report on the Radio-telegraphic Service for the fiscal year ended March 31, 1911.

The total number of commercial radio-telegraphic coast stations now in operation in Canada is thirty-two, an increase of three during the year; of the above stations, twenty-seven are owned by this Department and five by private enterprise.

WEST COAST.

The following coast stations owned and operated by the Department on the Pacific Coast, handled business during the year, as follows:—

Name of Stations.	Revenue.	Cost of Maintenance.
Victoria.....	\$ 988 16	\$3,103 03
Point Grey.....	498 76	2,176 84
Cape Lazo.....	29 67	3,321 83
Pachena ...	1,081 25	2,880 56
Estevan.....	Nil.	2,060 28
Triangle Island	2 25	2,906 10
Ikeda Head.....	164 97	2,260 28
Dead Tree Point	13 69	1,079 99
Prince Rupert.....	329 88	2,207 19
	\$3,108 63	21,996 10
Upkeep local office at Victoria, B.C.....		3,576 77
General account charter of steamers, freight, travelling expenses, &c.....		5,291 66
Total cost of maintenance for fiscal year, 1910-11.....		\$30,864 53

The business handled by the above stations during the preceding fiscal year 1909-10 was 18,469 messages, containing 265,414 words. The present year shows an increase of 43,919 messages and 527,588 words over last year's business.

The west coast stations continue to handle the weather reports for the Meteorological Branch of the Marine and Fisheries Department, and the service given has proved very satisfactory.

During the year special attention has been given to the Signal Service reports provided by the stations, and every effort has been made to perfect the organization in this connection. Each station prepares three times daily at 8 a.m., noon and 6 p.m., a report containing the following information:—

- Barometer reading.
- Temperature.
- Strength and direction of wind.
- General weather conditions.
- Shipping sighted and time of same.
- Shipping spoken by wireless, location and time of same.

This report is forwarded by wireless to the Prince Rupert, Victoria, and Point Grey (Vancouver) stations, and is kept on file at these offices. Ships equipped with wireless telegraph apparatus are practically always in touch with one or other of the stations, and we are thus enabled to keep a constant record of their movements. The three stations mentioned above are connected with the local telephone exchanges and all information contained in the signal service report is given to the public free of charge upon request.

It is of much value to ship owners and agents who are thus enabled to keep informed of the positions of their vessels.

Advantage is also taken of the same by several western newspapers, who publish the reports in full in connection with their shipping intelligence.

On June 1, 1911, a commercial service was inaugurated in connection with the stations on the Pacific coast. The stations will now handle all business offering to and from the ships, also local business between stations. The rates charged are \$1.20 for the first ten words of text, 12 cents for each additional word of text on all messages to and from ships with the exception of messages to and from ships on the ship's business, on which a reduced rate of 50 cents and 3 cents is given, and on messages to and from ships on the ferry run between Vancouver, Victoria and Seattle, on which a rate of 25 cents and 1 cent is given.

A twenty-four hour watch is kept on all the above stations with the exception of Ikeda Head (8 a.m. to 12 p.m.) and Dead Tree Point (8 a.m. to 6 p.m.) and the stations are instantly available in case of casualties to steamers.

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The wireless service has proved its usefulness in several of the latter which have occurred on the coast during the past year, of which the following are among the most important:—

December 2, 1910, the SS. *Northwestern*, Capt. Croskey, owned by the Alaska Steamship Co., ran ashore on Pile Point, San Juan Island, Washington. She sent out wireless distress calls, which were responded to by our Victoria station and the C.P.R. steamer *Tees*; the B.C. Salvage Company was communicated with and the wrecking steamer *Salvor* sent to her assistance.

January 27, 1911, the steamer *Cottage City*, owned by the Pacific Coast Steamship Co., ran ashore on Cape Mudge in a blinding snowstorm. She sent out distress signals and her owners were communicated with by our Cape Lazo Station. The vessel was abandoned half an hour after striking.

January 27, 1911, the steamer *Tees*, Capt. Gillan, owned by the C.P.R. Co., grounded in Berkley Sound. Communication was established with Pachena and twenty minutes after the stranding the owners were notified and assistance was despatched from Victoria and the United States life-saving station at Tatoosh. The vessel was floated next morning.

February 2, 1911, the steamer *Princess Adelaide*, Capt. ————, owned by the C.P.R. Co., grounded on Apple Cove Point. Communication was immediately established with the Victoria station; the vessel was floated the next morning.

February 3, 1911, the steamer *Victoria*, owned by the Alaska Steamship Co., ran ashore on Cape Mudge. Communication was immediately established with Cape Lazo station. The vessel was floated without damage and no assistance was required.

February 3, 1911, the steamer *Titania*, Capt. Kreeger, ran ashore on Stuart Island. This steamer was not equipped with wireless, but sent a boat to the nearest wireless station, which conveyed the news to Victoria, and the desired assistance was obtained.

The scheme laid down to duplicate the apparatus on all stations and to keep the standard of the same up to date, with all new developments of the art, has been steadily adhered to, and the following construction work has been undertaken during the year.

VICTORIA.

The power of the station has been increased to enable communication to be established direct with Pachena. One and a half acres of land adjoining the present site have been purchased, and a second two hundred foot mast erected on the same to provide support for an aerial large enough to work the desired distance.

A gasoline engine driven emergency set (6 horsepower) was installed in case of accident to the local power company's transmission lines. Also a complete duplicate set of transmitting and receiving apparatus.

This work has been carried to completion and satisfactory communication was established with Pachena.

The total cost of the above work was \$8,940.28 (including cost of land).

POINT GREY.

A type No. 1 operating house 35' x 16' complete with concrete engine beds was erected at this point, and the apparatus transferred to the same from the dwelling house. The old 3 h.p. set at Cape Lazo was dismantled and re-erected at Point Grey, for a duplicate plant.

The 300 ft. tree which is used to support the aerial wires was provided with steel wire guys and 50 ft. of the top of the same was cut off.

A 4,000 gallon concrete water tank was installed in the basement of the dwelling house for water storage.

Some small alterations were made to the interior of the dwelling house which was painted.

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A telephone line to the city limits was erected and the station connected to the Vancouver exchange.

The above work was carried to completion at a total cost of \$3,556.21.

CAPE LAZO.

Three acres of land adjoining the present site were purchased at Cape Lazo and a topmast was erected on the top of a tree located on the same to provide a support for an aerial large enough to establish communication between Cape Lazo and Pachena. The total height of the improvised mast is 180 feet, and the same has been provided with the necessary guys.

A type No. 2 operating house 40' x 18' complete, with concrete engine beds was also installed on the new land, together with a complete new 6 h.p. plant.

The old 3 h.p. plant, which was installed in the dwelling house was dismantled and shipped to Point Grey.

Some small alterations were made in the interior of the dwelling house which was painted.

A small store and wash house was erected in connection with the dwelling house and a porch was placed on the rear door of the latter.

The whole of the new land was cleared and a proper fence erected around the same. Some repairs were also made to the trails.

The above work was carried to completion at a total cost of \$5,729.85.

PACHENA.

A gasoline and coal storehouse 24' x 12' was erected at this point. A concrete water tank, 3,000 gallons, was installed under the dwelling house, and the latter was overhauled, repaired and painted. Two trees were trimmed and fitted to support the long aerial necessary to establish communication between Pachena and Victoria-Cape Lazo.

Some small repairs were made to the operating house and a new receiving equipment was installed.

The above work was carried to completion at a total cost of \$3,503.12 (including charter of steamer).

ESTEVAN POINT.

The old 3 h.p. set at Victoria was dismantled and re-erected at Estevan point. Some small structural alterations were made in the operating house to accommodate the above, and concrete engine beds were installed.

A tree was trimmed to make a support for the aerial and the mast and all buildings were painted.

The above work was carried to completion at a total cost of \$1,519.71.

TRIANGLE ISLAND.

The work on the erection of this station which was commenced during the preceding year was carried to completion, including the installation of a complete duplicate plant, comprising a 6 h.p. engine, machines and the necessary apparatus.

The mast, which was damaged in a hurricane, was repaired.

The above work was carried to completion at a total cost of \$6,697.77.

HKEDA HEAD.

A concrete foundation was installed under the dwelling house at this point, and the necessary concrete engine beds for a duplicate plant; the latter, comprising a 6 h.p. engine, necessary apparatus and machines was installed.

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The trees supporting the aerial extensions were trimmed and provided with guys. Some work was done on the trail and telephone line between the station and Ikeda Bay.

The above work was carried to completion at a total cost of \$6,211.80 (including charter of steamer).

PRINCE RUPERT.

The work on the erection of this station, which was commenced during the preceding year was carried to completion. The cable to the mainland was laid and a land line erected along the Grand Trunk poles to the City of Prince Rupert.

A complete duplicate plant consisting of a 6 h.p. engine, machines and the necessary apparatus was installed.

The above work was carried to completion at a total cost of \$9,179.37.

DEAD TREE POINT.

A complete new station was erected at Dead Tree Point, Queen Charlotte Islands, consisting of one dwelling house and outbuildings, one operating house and one storehouse.

A single 6 h.p. 2 k.w. complete plant was installed, and two trees were trimmed, guyed and fitted for the support of the aerial.

Fourteen miles of telephone line to connect the station with the oil works, Skidegate and Queen Charlotte City were installed, including the necessary telephones.

The above work was carried to completion at a total cost of \$17,233.70, (including charter of steamer).

NIGHT WORKING ON THE WEST COAST.

The peculiar phenomena affecting the range of wireless telegraph stations on the west coast has been very marked during the past year. It has been observed that between sunset and sunrise during the fall, winter and spring months, the range of the stations, both for transmitting and receiving, is increased from 300 to 500 per cent. The phenomena is somewhat erratic. On some nights it is continuous and constant communication can be maintained with another station within the zone, but on other nights it is intermittent and communication may be excellent for an hour, when the signals will suddenly fade away and then after a short period come on again. This may occur several times during the transmission of one message.

The greatest distance over which communication has been established under these conditions is between Triangle Island and Honolulu, a distance of approximately 2,500 miles. The daylight range of the Triangle equipment is 400 miles.

Another peculiar feature in connection with the above is that while the Victoria station is in communication practically every night with Ikeda Head, 400 miles north, 250 of which are over high land, and with the stations along the west coast of the United States as far down as San Diego, 1,000 miles south of Victoria, all of which is over high land, including the Cascade Range and the Sierra Nevada, rising to a height of 15,000 feet, no improvement has ever been noticed in the communication between Pachena Point, B.C., and Victoria, B.C., 75 miles apart.

No reasonable explanation for the same has yet been discovered. A systematic observance of the phenomena is being made and when more precise information is available there is no doubt some satisfactory explanation will be forthcoming.

STATIONS.

The following stations on the east coast are owned by this department and operated by the Marconi Wireless Telegraph Company of Canada, under contract.

The business handled by them, cost of maintenance, &c., for the fiscal year was as follows:—

STATIONS ON THE EAST COAST.

Name of Stations.	Private business to and from ships.		Private business between stations.		Business to and from government ships.		Government business between stations.		Service messages.		Re-transmitted messages.		Cost of maintenance.	Range in nautical miles.
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	\$ cts.	
Cape Sable, N.S.	2,006	20,191	1	8	225	4,179	22	303	995	20,682	.....	.....	3,519 98	250
St. John, N.B.	30	542	.....	.....	134	2,650	4	39	503	13,138	.....	.....	3,499 98	250
Cape Bear, P.E.I.	96	3,704	265	13,565	803	13,872	236	3,592	88	2,818	.....	.....	2,500 02	150
Cape Race, Nfld.	4,612	46,442	.....	.....	141	2,494	.....	.....	1,789	22,568	.....	.....	3,499 98	400
Cape Ray, Nfld.	472	6,137	1,222	16,661	61	620	492	2,410	1,439	15,887	192	3,608	3,499 98	350
Fame Point, P.Q.	764	15,225	235	5,206	231	4,544	2,071	25,068	3,699	62,453	.....	.....	3,499 98	250
Clarke City,	2	22	769	18,472	18	414	26	356	895	7,064	.....	.....	3,504 33	250
Father Point, P.Q.	777	11,168	682	17,214	213	3,900	153	1,915	1,872	34,809	.....	.....	3,499 98	250
Heath Point, P.Q.	7	101	11	176	128	1,612	415	4,269	337	4,501	4,715	70,269	3,499 98	250
Belle Isle, Nfld.	592	7,596	78	1,658	74	1,638	1,004	12,738	1,318	24,699	2,401	36,368	4,499 98	250
Point Amour, Nfld.	89	1,024	339	4,914	28	542	796	10,680	1,527	18,313	3,785	59,049	3,500 02	150
Point Rich, Nfld.	328	1,173	92	946	11	466	23	661	889	9,991	3,019	49,230	3,499 98	250
Harrington, P.Q.	64	979	154	2,123	9	191	40	1,140	515	4,231	105	2,141	2,500 02	150
Total.	9,839	114,307	3,848	80,943	2,079	37,122	5,282	63,171	15,866	241,154	14,217	220,665	44,524 21	

Total cost of maintenance.	\$44,524 21
Total number of messages handled.	49,339
" " of words handled.	789,151

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The above stations continue to handle the signal service reports for the Marine and Fisheries Department, and are giving a very satisfactory service in that connection. Considerable business is also handled for the Meteorological Branch of the same department.

GLACE BAY TRANS-ATLANTIC STATION.

On January 4, 1911, in company with the Deputy Minister, a visit was paid to the Trans-Atlantic station at Glace Bay, C.B. This station is owned and operated by the Marconi Wireless Telegraph Company. The same was subsidized by the government to the extent of \$80,000 in 1902, and an agreement was entered into between the Government and the company whereby they agreed to charge not more than ten cents per word for private messages, and five cents per word for press messages, transmitted between Glace Bay station and a similar station on the coast of Great Britain.

The signals from the Clifden station (Ireland), came in about as strong as those received from the average ship when 150 miles distant from the coast station, and were easily readable.

A message was sent to Mr. Marconi in London, to which a reply was received an hour later.

The methods by which the high power is handled, and the numerous automatic devices for safeguarding the operators, &c., reflect much credit on the designers of the station.

The weak spells at dawn and sunset which were encountered when the old apparatus was in operation have been overcome, and the signals with the new apparatus are found to maintain their strength throughout the twenty-four hours.

The trouble encountered with the atmospherics has also been very much reduced.

The company has opened a receiving office in Montreal where messages are accepted for transmission to England at 15 cents per word.

The business handled by the station averages 7,195 messages containing 106,480 words per month, which is about half the capacity of the station.

CONSTRUCTION WORK.

Magdalen island, P.Q., a complete new 1½ K. W. station, including living accommodation for operators; 185' mast; 4 h.p. gasoline engine and plant was erected on Grindstone Island during the year. The Marconi Wireless Telegraph Company of Canada were the contractors and the contract price was \$7,000.

Communication is now established between the Magdalen Islands and Cape Ray, Nfld.; Cape Bear, P.E.I.; Heath Point; Anticosti and Pictou, N.S., stations, thus giving the island an alternate method of communicating with the mainland in the case of a breakdown on the cable.

Since its inauguration the Magdalen island station has handled business as follows:—

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The wireless service proved of considerable value in connection with several casualties which occurred on the St. Lawrence route during the year. The most important was the stranding of the *Prinz Oskar*.

'The S.S. *Prinz Oskar*, a vessel of approximately 7,000 tons, with a large and valuable cargo sailed from Montreal on Saturday, June 18, 1910, bound for Rotterdam, Bremen and Hamburg. At 8.40 p.m. on Monday, June 20, the vessel went ashore to the southwest of Flower Ledges, Newfoundland, near the western entrance to the Straits of Belle Isle.

At 8.45 p.m. the Captain authorized the wireless C.Q.D. call which was immediately answered by the Belle Isle station and the SS. *Sicilian*. The Belle Isle station informed the *Prinz Adalbert*, which was 140 miles east of Belle Isle, of the accident to her sister ship and the Captain of the *Prinz Oscar* was at once informed that the Belle Isle station was in communication with the *Prinz Adalbert*. At 11.28 p.m. the *Corinthian* exchanged calls with the *Prinz Oskar* and asked if she should proceed to the assistance of that vessel. The Captain, however, replied that he did not require any assistance. Continuous communication was held during the night of June 20, and the morning of June 21, with the Belle Isle, Point Amour and Point Rich stations, and also with the *Sicilian* and the *Montcalm*, while messages were continuously exchanged between the Captains of the *Prinz Oskar* and *Prinz Adalbert*.

In the meantime the news had been communicated to the owners, and the wrecking steamer *Strathcona* was despatched from Quebec. The people along the shore also received the news and in consequence the Newfoundland steamer *Diana* left Blanc Sablon for Flower Ledges, anchoring near the *Prinz Oskar* at two o'clock in the afternoon of June 21. While the position was extremely dangerous there were no passengers on board and the Captain naturally preferred to receive any assistance necessary from the *Prinz Adalbert* of the same line. The latter vessel was in constant wireless communication with the *Prinz Oskar* during Tuesday, arriving alongside of the *Prinz Oskar* at 6 a.m. Wednesday, June 22, and immediately attempting to refloat the latter steamer. At 9.05 p.m. on Wednesday, she succeeded in refloating the stern of the *Prinz Oskar*, the fore part of the ship, however, still remaining on the rocks.

Further attempts to refloat the steamer were made during Thursday, June 23, until 6.30 p.m., when the position of the steamer becoming very dangerous, the Captain ordered the crew to keep boats and life preservers in readiness as the ship might have to be abandoned at any time. On Friday at 10.30 a.m. the *Prinz Adalbert* succeeded in refloating the *Prinz Oskar* which immediately anchored, awaiting the arrival of the wrecking tug. As the position of the *Prinz Oskar* was now comparatively safe the *Prinz Adalbert* proceeded on her way to Quebec. On Saturday afternoon, June 25, the wrecking steamer *Strathcona* arrived from Quebec, and at 8.15 p.m., the steamer left her anchorage in company with the *Strathcona*. Despite the fact that the trip up the Gulf was a rough one, continuous head winds and heavy seas being met with, the vessel was safely escorted to Quebec, entering the dry dock where repairs were effected.

It is worthy of notice that the moment the steamer went aground she was in communication not only with the stations at Belle Isle and Point Rich, but also with the steamer *Sicilian*; and that during the time she was aground she was in constant communication, not only with the shore stations at Point Rich, Point Armour and Belle Isle, but had within radius of communication at all times, a minimum number of three steamers, any one of which would have proceeded to her assistance had it become necessary.

There is little doubt that had the steamer remained another twenty-four hours on Flower Ledges she would have been a total wreck. The saving of the ship was, therefore, due to the fact that she was able to receive almost immediate assistance from another vessel (fortunately a ship of the same line) which succeeded in refloating the

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stranded vessel within a comparatively short time, and also to the fact that prompt notice of the mishap was given to the owners, enabling them to despatch immediately a wrecking steamer to the assistance of the stranded vessel.'

Another interesting case in which wireless telegraphy proved of great value, and in which the government wireless service played an important part, was in the rescue of the men of the steamer *West Point* which foundered at sea. The facts of the case are as follows:—

On Friday morning, August 21, 1910, a boat was sighted off the port bow of the *Devonian*; the ship was kept away towards her and she proved to be a lifeboat from the steamer *West Point* of Liverpool; the ship was stopped at 8:53 a.m. and sixteen men taken out of the boat. Their names were C. D. Meckle, Chief Officer; H. W. Barker, Third Officer; J. Roche, W. Aspetas, J. Lloyd, A. Bs.; W. Westlake, Second Engineer; Mason, Fourth Engineer; A. Murphy, T. Stewart, Edid and Lukin, Firemen; C. Levis, Mess Room Steward.

The boat was pulled up in the davits, stimulants supplied to the men and they were taken care of. Chief Officer Meckle reports that the steamer had foundered on Sunday, August 28, at 6 p.m. in lat. 45.43 north 40.41 west, catching fire at 6 a.m. on the 27th. They last saw the Captain's boat containing the remainder of the crew, in all sixteen men, on Thursday at 6 a.m. in about 47.8 N., 42.23 W. The Captain let them know he intended keeping to the east bound track. Thinking the boat might be in the vicinity and the weather coming thick the ship was stopped two hours, firing distress bombs at intervals to attract attention. The weather clearing somewhat at 11 a.m. they stood to S.S.E. and to southward, finally hauling on to course again. At 2.30 p.m. the weather was misty at times, and as the distance of observation was not great they failed to see anything of the missing boat. From the time of getting the mates report they have been in constant communication with passing homeward bound ships by wireless telegraphy, asking them to keep a good look out for the boat, also passed word through to Cape Race to report the matter. Received replies by wireless from *Kronprinz Wilhelm*, *Haverford*, *Mauretania*, *Pretoria*, *New Amsterdam*, *Pollanza*, *Ivernia*, *Teutonic*, *Lalorraine*, a Wilson liner and the *Pennsylvania*, all promising to keep a good look out. This morning they received word from the *Mauretania* via Cape Race and the *Deutschland* that she had picked up the captain's boat from the *West Point* and that all was well. The men had a very trying time during the five days in the small boat.

The first two days were moderate, after that, they met with tremendous sea in heavy gale with continual rain. They were pulling for seven hours in heavy seas in order to keep the boat's head on, and during this time they were all wet through. On Thursday the weather moderated and they got into the westward track about 2 on Friday morning. At this time they were feeling in a very exhausted condition. They sighted the *Devonian* about 8 a.m. on the Friday morning. Great excitement was caused amongst the passengers, who had taken up a collection for the shipwrecked men.

GREAT LAKES.

A scheme has been drawn up for the establishment of a wireless telegraph system on the Great Lakes, which will include a chain of stations, approximately 180 miles apart, from Port Arthur to Kingston, with a station at Kingston of sufficient range to communicate with Montreal, thus linking up the proposed system with the east coast system and giving through communication between Belle Isle or Cape Race and Port Arthur. The scheme as draughted out will include stations at or in the neighbourhood of the following points:—

Kingston, Ont.
 Toronto, Ont.
 Port Colborne, Ont.
 Port Stanley, Ont.
 Sarnia, Ont.
 Tobermory, Ont.
 Midland, Ont.
 Sault Ste. Marie, Ont.
 Port Arthur, Ont.

A preliminary survey of the points has been made and sites have been secured at Port Arthur, Sault Ste. Marie, Tobermory, Midland and Point Edward (Sarnia).

CONSTRUCTION WORK.

A station was erected by the Marconi Wireless Telegraph Company of Canada at Port Arthur, Ontario, in November, 1910. The company erected this station at their own expense, but under an arrangement with this Department whereby the Department may take over the same should they wish to do so. The Port Arthur station proved its value immediately after being placed in commission. The steamer *Dunedin* of the Inland Lines ran ashore on Isle Royale on December 7, 1910.

She was not equipped with Radio-telegraph apparatus, but a freighter equipped with the same, sighted her distress rockets and reported the casualty to the Port Arthur Radio-telegraph station. The tug *James Whalen*, with a wrecking equipment was sent to the assistance of the stranded steamer. Constant communication was maintained between the wrecking outfit and Port Arthur, and the boats were warned of the approaching storms, enabling them to take shelter in neighbouring bays during operations.

SHIPS.

The following Canadian Government Steamers are equipped with wireless apparatus and are operated by the Department of Marine and Fisheries.

	Range.
C.G.S. <i>Quadra</i>	100 miles.
C.G.S. <i>Minto</i>	150 “
C.G.S. <i>Stanley</i>	150 “
C.G.S. <i>Lady Laurier</i>	150 “
C.G.S. <i>Aberdeen</i>	100 “
C.G.S. <i>Druid</i>	100 “
C.G.S. <i>Earl Grey</i>	200 “
C.G.S. <i>Montcalm</i>	150 “
C.G.S. <i>Montmagny</i>	200 “
C.G.S. <i>Lady Grey</i>	100 “

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LICENSES, SHIP.

In accordance with part IV. of the Telegraphs Act whereby no person may operate a Radio-telegraph station except under license from the Minister of the Naval Service, licenses have been granted for the installation and operation of Radio-telegraph stations on the following ships:—

SS. <i>Princess May.</i>	SS. <i>Boston.</i>
SS. <i>Princess Charlotte</i>	SS. <i>Huronic.</i>
SS. <i>Princess Victoria.</i>	SS. <i>Majestic.</i>
SS. <i>Princess Royal.</i>	SS. <i>Germanic.</i>
SS. <i>Princess Beatrice.</i>	SS. <i>City of Midland.</i>
SS. <i>Athabasca.</i>	SS. <i>Prince Albert.</i>
SS. <i>Alberta.</i>	SS. <i>Prince Rupert.</i>
SS. <i>Manitoba.</i>	SS. <i>Prince George.</i>
SS. <i>Harmonic.</i>	SS. <i>James Whalen.</i>
SS. <i>Saronic.</i>	Barge <i>Luddington.</i>
SS. <i>Assiniboia.</i>	Barge <i>Imperial.</i>
SS. <i>Keewatin.</i>	Barge <i>Empire.</i>

LICENSES, EXPERIMENTAL.

One experimental license was granted during the year to Mr. Frank Vaughan, St. John, N.B., for the erection and operation of an experimental wireless station.

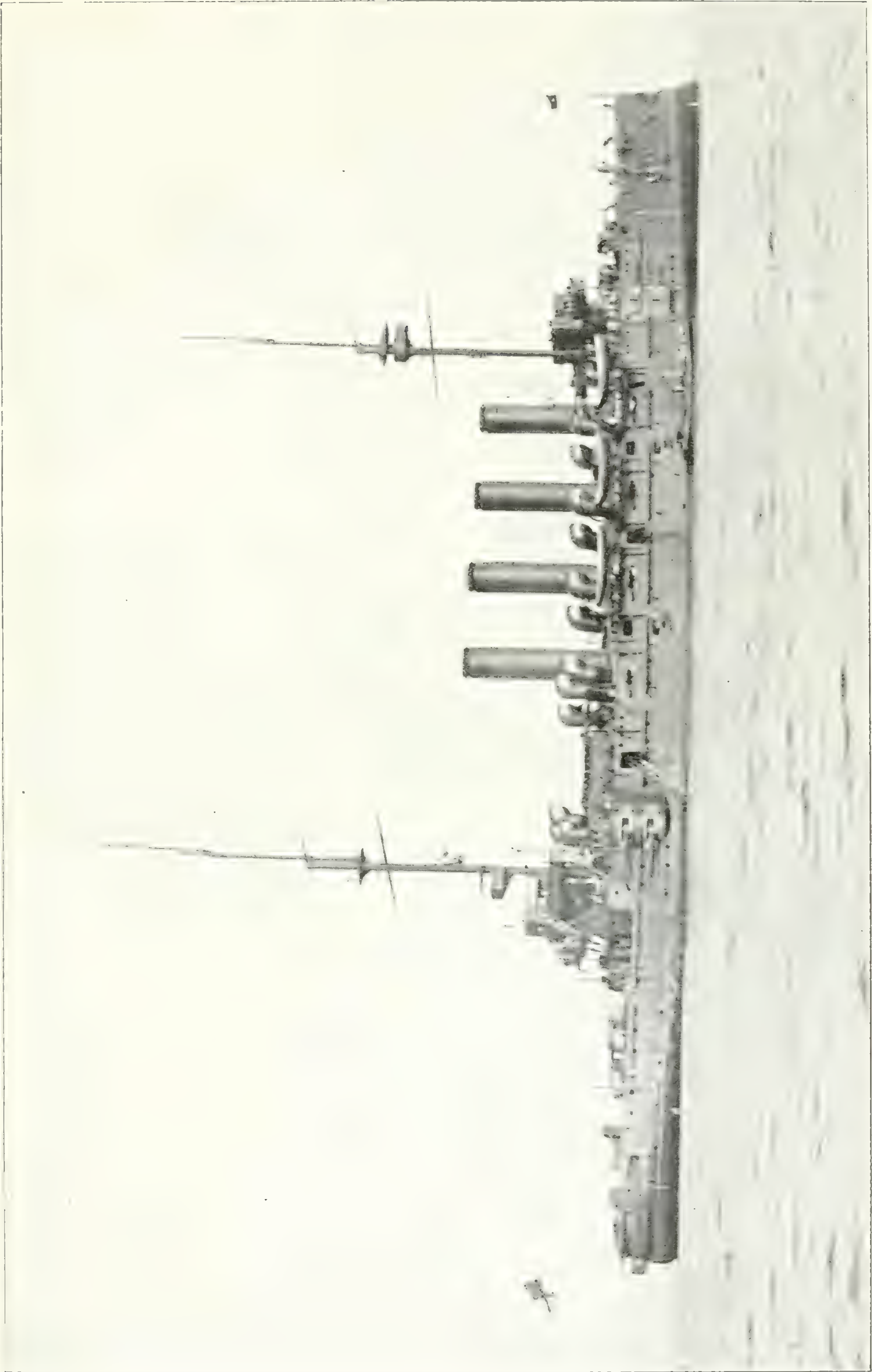
LICENSES, COMMERCIAL.

No commercial licenses for the operation of commercial wireless telegraph stations were granted during the year.

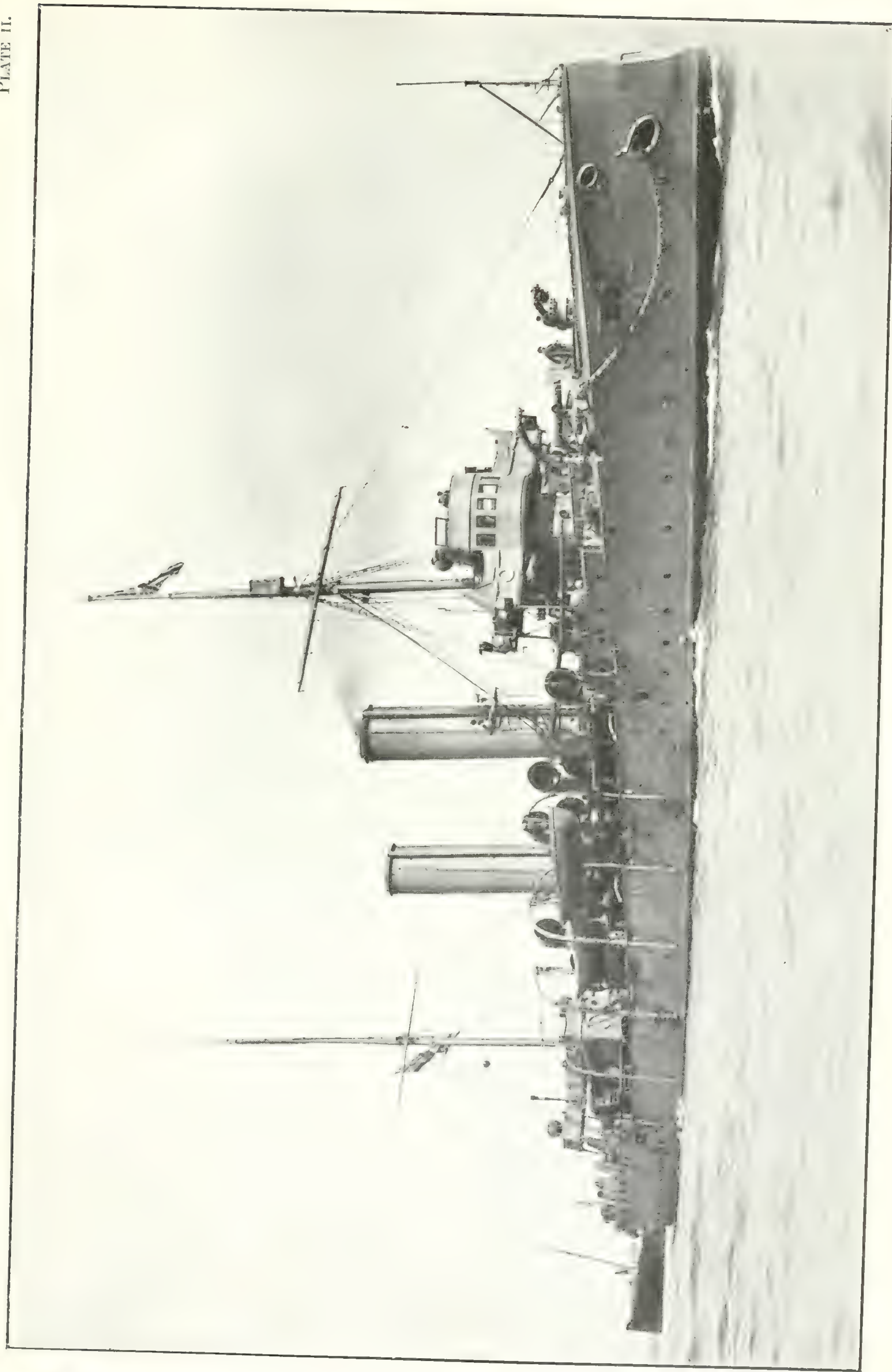
I have the honour to be, Sir,

Your obedient servant,

C. P. EDWARDS,
General Superintendent Government Wireless.

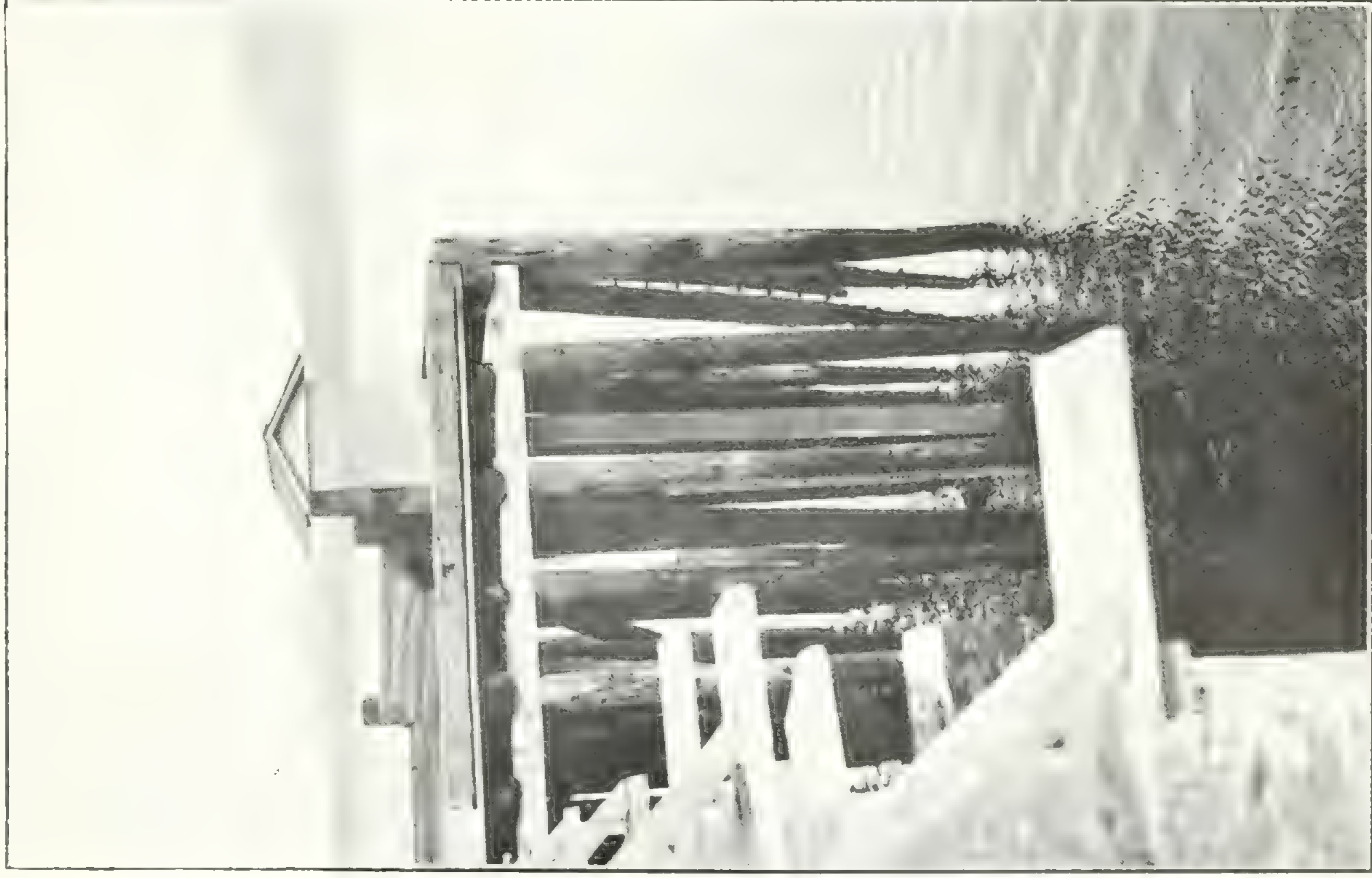


H.M.C.S. "NIOBE."



H. M. C. S. "RAINBOW."

PLATE III.



A Tidal Station. Shelter-house and Tide Scale at Port Simpson, B.C.

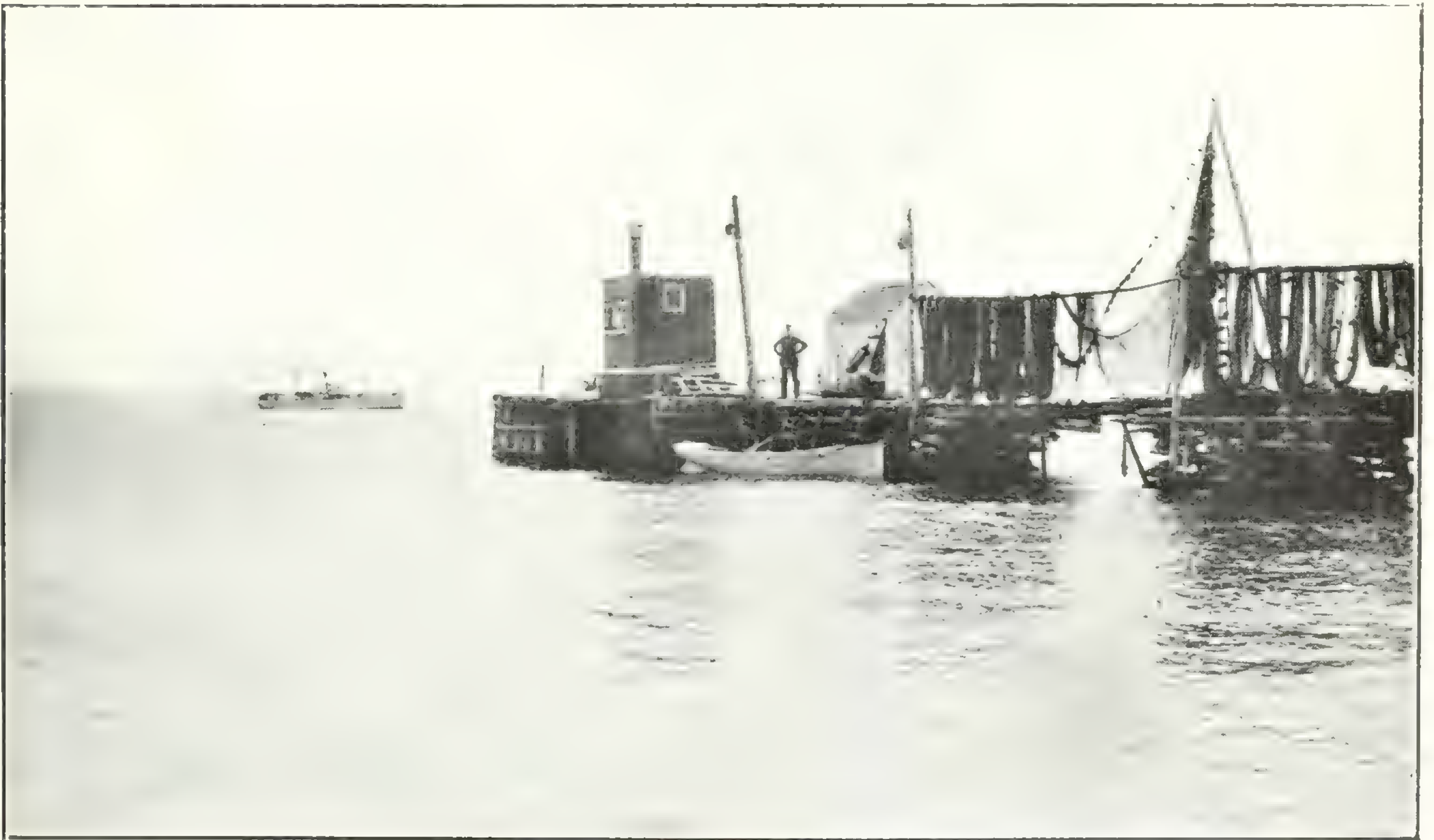
PLATE IV.



A summer Tide Gauge. On a fishing stage at Mingan.



A principal Tidal Station. A Tide gauge on St. Paul Island, Cabot Strait.



A principal Tidal Station. The Tidehouse at Forteau Bay, in Belle Isle Strait.

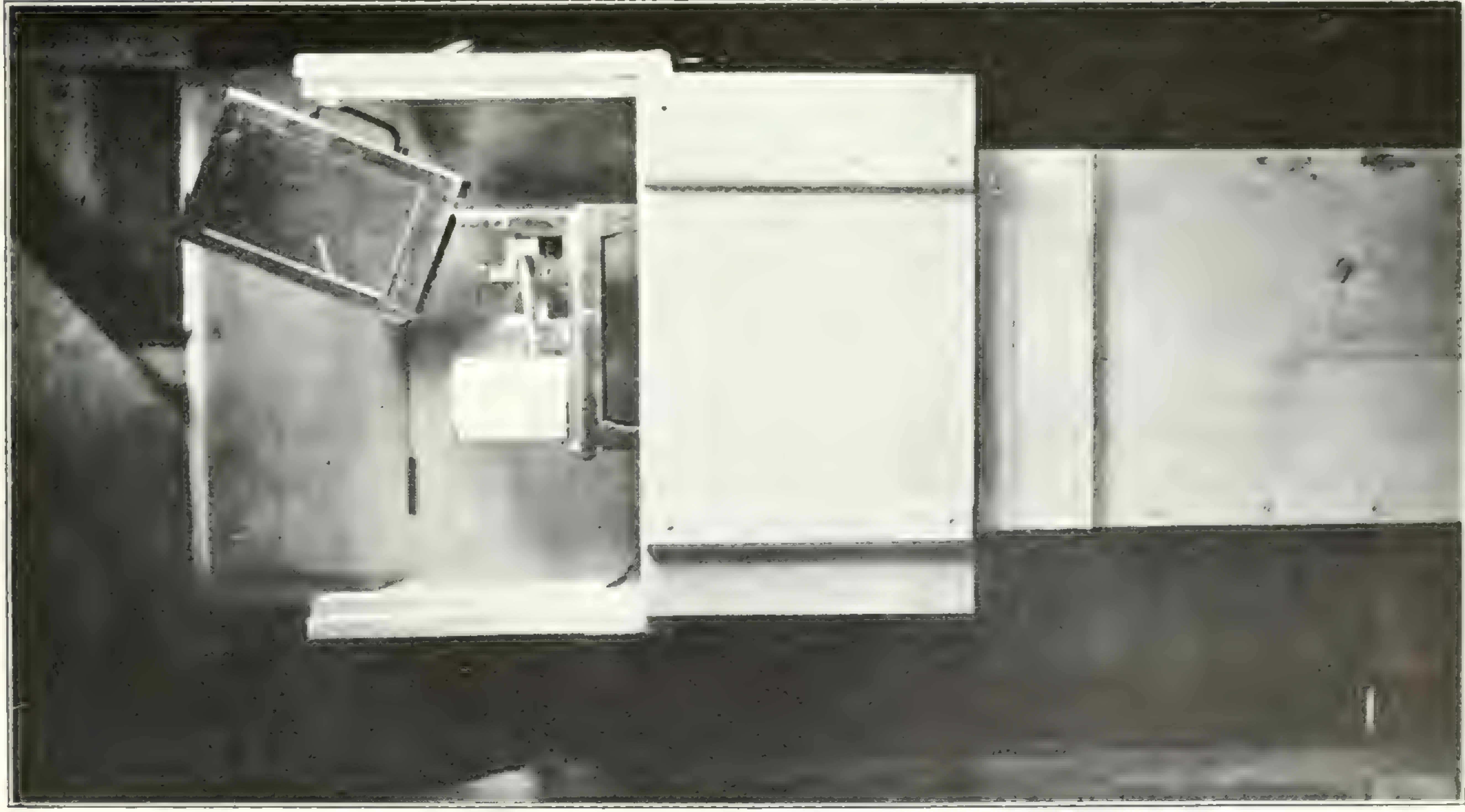


C.G.S. "GULNARE." Headquarters of the Tidal and Current Survey Staff.



Installation of a summer Tide Gauge. At Bella Coola, B.C.

PLATE IX.



A recording Tide Gauge.

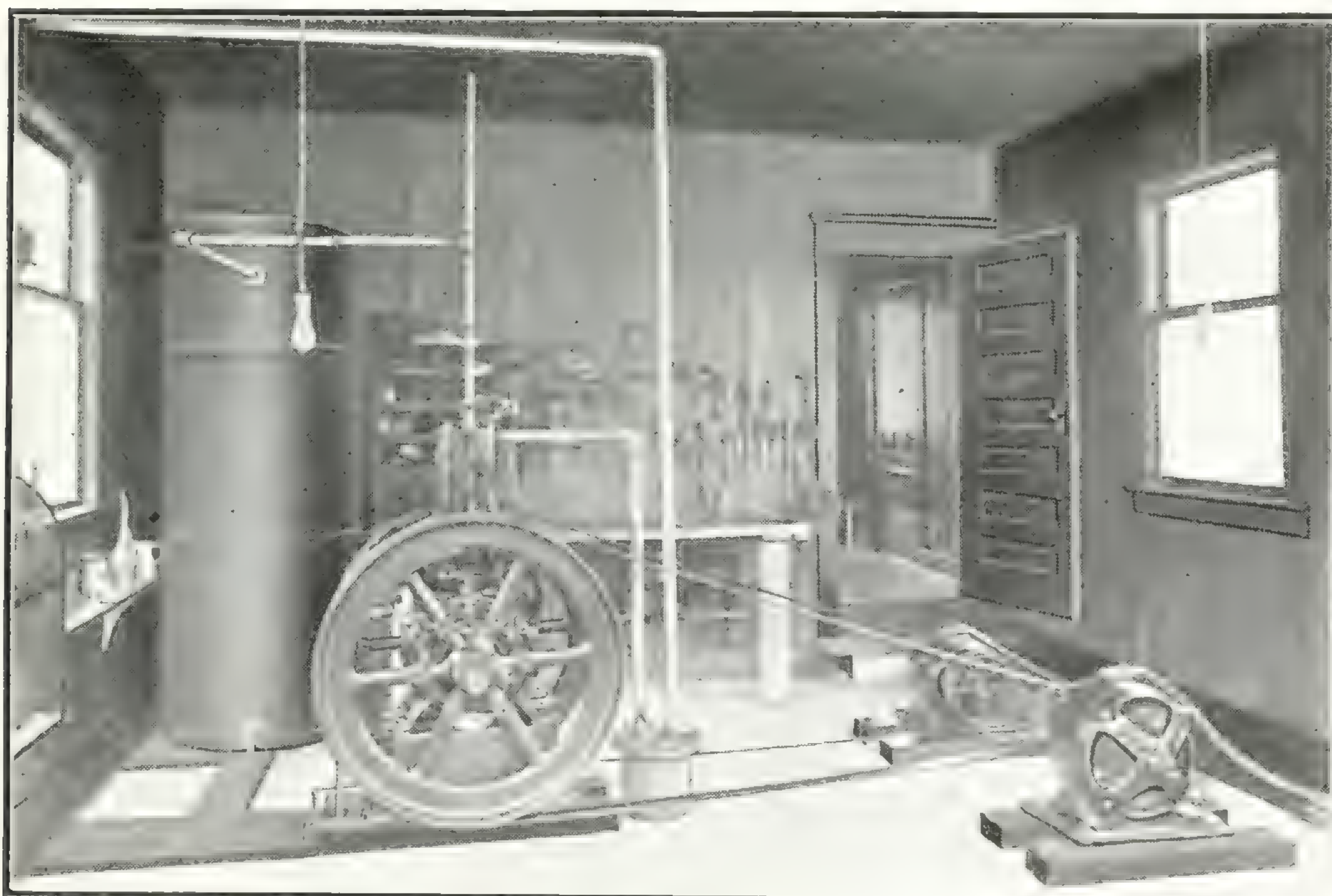
PLATE X.



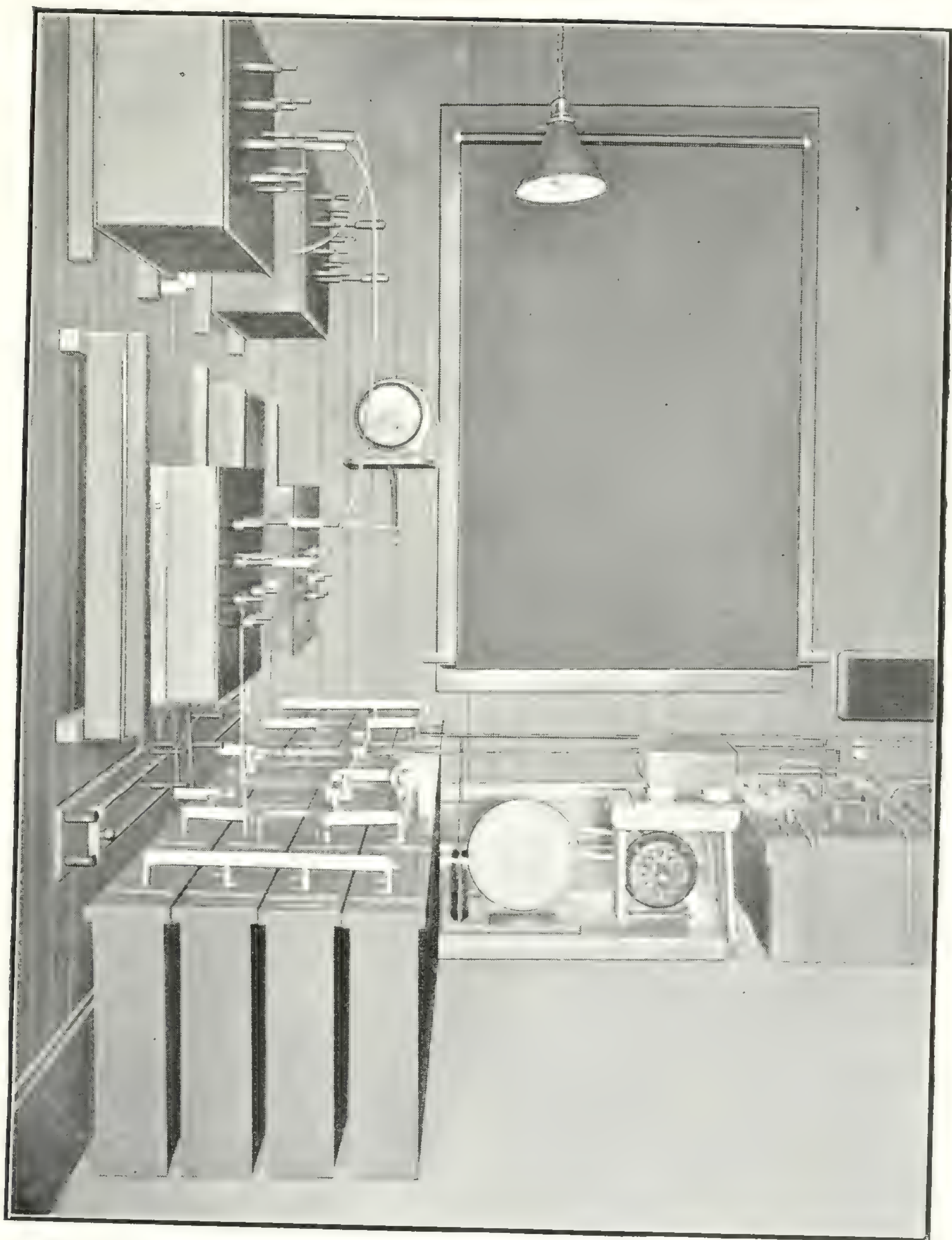
At a Tidal Station. The tide-scale by which a recording scale is correctly set for height.



Operating room at Government Radiotelegraph Station, Prince Rupert, B.C.



No. 1 Engine and Generators at Government Radiotelegraph Station, Ikeda Head, Q.C.I.



High Tension Room and Transmitting apparatus at Government Radiotelegraph Station. Victoria, B.C.



Type No. 1. Operating House at Government Radiotelegraph Station, Cape Lazo, B.C.



Exterior view Government Radiotelegraph Station, Prince Rupert, B.C.

CHART OF RADIO TELEGRAPH STATIONS

• • •

DEPARTMENT OF THE NAVAL SERVICE
CANADA
CHART OF RADIO-TELEGRAPH STATIONS
ON THE EAST COAST

Government Stations :- ●
Other " " ●

NM under station name shows range in nautical miles
M " " " " " wavelength in metres

-NOTE-

Govt Stations between Montreal to Pt Riche open
permanently day & night during season of navigation
Remainder of Stations except Pictou open
permanently day and night a year round
Pictou open permanently day and night during
winter season

